THE EFFECTS OF A COLOR-EMBEDDED WRITING STRATEGY ON THE WRITTEN EXPRESSION SKILLS OF STUDENTS WITH MILD-MODERATE DISABILITIES

By

CLAUDIA CECILIA OTTO

Bachelor of Science in Business Administration
Oklahoma State University
Stillwater, Oklahoma
1993

Master of Science in Education
Oklahoma State University
Stillwater, OK
2008

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 2013

THE EFFECTS OF A COLOR-EMBEDDED WRITING STRATEGY ON THE WRITTEN EXPRESSION SKILLS OF STUDENTS WITH MILD-MODERATE DISABILITIES

Dissertation Approved:

Christine K. Ormsbee, Ph.D.

Dissertation Adviser

Charles R. Davis, Ph.D.

Kimberly Davis, Ph.D.

Susan Stansberry, Ph.D.

Mwarumba Mwavita, Ph.D.

ACKNOWLEDGEMENTS

I would not have embarked on this doctoral journey had it not been for the encouragement and support received from my family, colleagues and students, graduate program professors and doctoral students I met, and friends. This work is dedicated to three groups whose individual and collaborative strengths and energy have helped me to persevere and for this dream to become real.

Family

My Husband: Thank you Dale, for your unyielding love, faith, and encouragement during my doctoral program. You never allowed me to disbelieve in my ideas or ability. Through immeasurable hours, you continued your support. I love you.

My Children: Thank you Victoria and Christopher, for your serenity and smiles while I continued working "one more hour" (times 20) on the computer. You never complained; you only respected my decision to pursue my educational goals. I love you and you make me proud to be your mama.

School (whose names shall remain anonymous in order to protect the confidentiality of this research study's participants)

My Principal: Thank you, Mr. M., Sir, for taking a leap of faith and allowing me to initiate and develop new interventions for my students whether academically,

behaviorally, socially, or functionally. Your "leadership with a heart" inspired me to constantly pursue ideas with confidence and develop plans of action that help others shine.

My Mentor Teacher and My Friend: Thank you Ms. R., for always being available as my "sounding board" and as my "lighthouse light", guiding my instructional practice. Your instructional style inspired me to constantly pursue further teaching ideas and professional growth because the kids need teachers ready to learn in order to teach.

My Students: Thank you all, for allowing me to know you individually. I see you and I hear you. I am the teacher I am today because you showed me your individuality, your strengths and weaknesses. You showed me that weakness is merely "strength in training". I am the teacher I am today because you placed your trust in me to show you new things. This research study's intervention has blossomed from working with my students individually and collaboratively and from their willingness and enthusiasm to try yet another of "Mrs. Otto's ideas".

Committee Members

Although you have joined me at various stages during my doctoral program, you have impacted my growth as an educator and a professional. Thank you, Dr. Christine Ormsbee, Dr. Robert Davis, Dr. Kimberly Davis, Dr. Susan Stansberry, and Dr. Mwarumba Mwavita for your guidance and consistently reinforcing support during my doctoral program. Thank you for your enthusiasm during my dissertation study. I am grateful to you all for listening to my ideas and my frustrations, for help with editorial

comments, for the unending guidance, and most of all for the moral support and friendship during my dissertation journey.

A special appreciation goes to my committee/dissertation chair, Dr. Christine Ormsbee. Thank you for your inspiration, constant encouragement, support, friendship, and belief in me. Recently, I overheard a wise man speaking to a colleague, regarding your presence in my pursuit of a Ph.D. He said that you "shepherded me" through this journey. You did! But you did so in a way that provided many wonderful opportunities for me to learn and grow as a student and professional. You encouraged me to evolve as an independent thinker. For that I give you my heartfelt gratitude.

Muchisimas Gracias!

Name: Claudia Cecilia Otto

Date of Degree: DECEMBER, 2013

Title of Study: THE EFFECTS OF A COLOR-EMBEDDED WRITING STRATEGY ON THE WRITTEN EXPRESSION SKILLS OF STUDENTS WITH MILD-MODERATE DISABILITIES

Major Field: Special Education

Abstract:
This research is a classroom case study to determine the effectiveness of a color-embedded writing strategy on the writing performance of adolescents with mild-moderate disabilities. Assessment and documentation of students' composition skills progress was made using the TOWL-4 writing assessments. Comparisons were made between those students who learned the written expression lessons through the use of a color-coding strategy and those who learned the written expression lessons without the color-coding strategy. As evidenced by the TOWL-4 sum of scaled scores and composite index scores, experimental groups' scores reflected a significantly higher increase in isolated written expression skills than the control groups' scores. Students' Contrived, Spontaneous, and Overall Writing skills reflected a significantly higher increase in the experimental groups' scores than the control groups' scores. Analysis of students participating in the experimental groups regarding students' reaction to the color-coding strategy revealed higher self-confidence and desire to participate in writing activities and tasks.

TABLE OF CONTENTS

Chapter Page

I. INTRODUCTION 1

Differentiated Teaching and Learning 4
Color-Coded Enhancement 8
Color-Coding 9
Color Rationale 9
Parts of Speech and Punctuation 10
Sentence Proficiency 10
Paragraph Proficiency 11
Essay Proficiency 11
Current Research and Practice 12
Theoretical Perspective 15
Research Purpose 17

II. REVIEW OF LITERATURE 19

Writing Problems Commonly Demonstrated by Students 20
Grammar and Mechanics 22
Written Text Organization 24
Writing Struggles 26
Existing Learning Strategies 28
Instructional Practice 28
Instructional Presentation 31
Research-Based Instructional Models 33
Interactive Communicative Instruction 41
Modalities Enhance Content Presentation 42
Imagery Promotes Thinking Processes 46
Patterns Enhance Content Acquisition 49
Visualization Supports Critical Thinking 51
Color-Coding Enhancement Impact on Writing Mechanics 53
Adding Color 54
Color-Coding Depicts Familiarity and Enhances Recall 57
Graphic Organization of Content Material 60
Teaching Visual Writing 63

Chapter Page

III. METHODOLOGY 72

Methods....72
Participants....75
Data Collection - Quantitative 82
TOWL-4 Assessment....83
Data Collection - Qualitative 84
Data Analysis....85
Validity, Reliability, and Generalizability....87
Confidentiality 89
Limitations....89

IV. FINDINGS....91

Quantitative Findings....91
Research Question 1 92
Contrived Writing....92
Spontaneous Writing....98
Overall Writing....104
Statistical Analysis....110
Research Question 2 116
Organization....116
Fluency....123
Research Question 3 130
Punctuation 130
Logical Sentences 137
Contextual Conventions....144
Research Question 4 151
Qualitative Findings....156

Chapter Page

V. DISCUSSION 168

Theoretical Frame and Purpose 169
Conclusions 170
Research Question 1 – Conceptual Development 170
Research Question 2 – Organization and Fluency 176
Research Question 3 – Grammar and Mechanics 179
Research Question 4 – Self-Confidence and Desire to Write 182
Recommendations 185
For Theory and Theory-Related Research 185
Implications for Future Research 186
Final Thoughts 187

REFERENCES 189

APPENDICES 206

LIST OF TABLES

Table Page

1 78
2 79
3 80
4 81
5 93
6 94
7 96
8 97
9 99
10 100
11 102
12 103
13 105
14 106
15 108
16 109
17 111
18 112
19 113
20 114

Table Page

21 118
22 119
23 121
24 122
25 125
26 126
27 128
28 129
29 132
30 133
31 135
32 136
33 139
34 140
35 142
36 143
37 146
38 147
39 149
40 150
41 153
42 154
43 159
44 160
45 160
46 162
47 163
48 164

CHAPTER I

INTRODUCTION

Written communication skills are viewed by many in education and the business world as a critical skill for success. This value is reflected by the extensive writing curriculum adopted by most states for P-12 schools and in the recent multi-state adoption of the Common Core Standards, which details a comprehensive approach to all elements of language arts curriculum for students to be college and career ready. Moreover, writing is a common way that students, particularly in secondary education settings, are asked to demonstrate their course content comprehension and mastery. Proficient writing skills are tools for students to gather, remember, and share subject-matter knowledge as well as explore, organize, and refine ideas. Thus, possessing strong writing skills is vital for individuals to support their success in their educational careers and well as later professional and personal endeavors.

Writing is highly complex and demanding because the writer must navigate and negotiate various rules and mechanics of the writing process. Learning effective composition skills is a challenge for many students (Harris & Graham, 2007; & Graham & Harris, 2003). Creating a well-written piece of text requires planning, generating,

organizing, structuring, and revising written material. It also requires the application of spelling, grammar and mechanical rules, and goal oriented reflective abilities. Thus a written composition reflects students' comprehension of concepts through acquisition and application of course content sub-skills associated with talking, listening, reading, writing, handwriting, and spelling. All in all, writing is a very complex process.

Many students with mild-moderate disabilities including: Autism Spectrum Disorder, Attention Deficit Disorders, Intellectual Disorders, Learning Disabilities, Traumatic Brain Injury, and Emotional/Behavioral Disturbance; experience academic struggles and frustrations when attempting to meet the complex demands of written composition (Gargiulo, 2012). While these students can function in the four basic skills of English: speaking, listening, reading, and writing; the most significant differences can be found in the area of written expression skills' proficiency (Gargiulo, 2012). In fact, approximately two in five students have specific goals in their Individual Education Plans (IEPs) addressing written expression skills (Kavale, 2005, 1995). Many students, who experience difficulties with the writing process, which hinders their growth and progress, exhibit poor critical self-regulation and composition strategies and skills. Poor composition strategies and skills reflect inadequate conceptual understandings, inefficient organizational skills, and ineffective use of grammatical and mechanical tools. As a result, these students require a special education English curriculum typically delivered by a special education teacher. But, it is imperative that special educators use the most effective and efficient approaches to improve students' written composition skills, which will impact their success in later educational and professional activities.

According to Graham & Harris (2003), good writing involves three basic processes: "planning what to say and how to say it, translating plans into written text, and reviewing to improve existing text" (p. 323). Students with mild-moderate disabilities may have difficulty with all of these processes, but in particular, understanding how to turn their ideas and thoughts into a coherent written product is a significant challenge (Graham & Harris, 2003; Schraeder, 1997 a, b). Frequently, students lack proficiency in idea generation and sentence production (Tarasovic, 2011; Schraeder, 1997 b; Urowitz & Bozzato, 1992; & Alley & Deshler, 1979). Textual structure normally reflects irrelevant detail and inappropriate conclusions (Schraeder, 1997 a & Alley & Deshler, 1979). Clearly, a better understanding of the writing process would dramatically improve the performance of adolescents identified as having learning disabilities in the area of written expression.

Because the writing process can be so difficult for students with mild-moderate disabilities, a systematic implementation of instruction that provides distinctive and clear processes as well as using embedded supports is needed. There are many approaches to teaching written expression to students with mild-moderate disabilities. Unrau (2004) reports that students who struggle with writing require differentiated learning strategies to help them understand the various writing content areas and develop important writing skills. Learning strategies that emphasize process-oriented teaching have been found to be very effective in helping students with mild-moderate disabilities improve writing skills (Paxman, 2011; Kabuto, 2009; & Graves, Valles, & Rueda, 2000).

Differentiated Teaching and Learning

Differentiated instruction can be viewed as an educator's response to the diverse learning needs of his/her students. Effective differentiated instruction is comprehensive in nature and focused on learning outcomes. Although course content is mandated by adopted state curriculums and/or national standards, it is still up to the teacher to decide how to modify the content and/or presentation in order to address the varied learning needs of students. Gardner's work on multiple intelligences suggests that teachers plan instruction that takes students' intelligence styles into consideration (Moran, Kornhaber, & Gardner, 2006 & Gardner, 2004). Tomlinson (2006), in conjunction with Gardner's research, emphasizes the need for teachers to personalize instruction through the manipulation of the content, processes, and student products. Also, the teacher can offer students choices in how they can demonstrate their learning based on the student's preferences such as preparing a multi-media presentation or writing a detailed essay. Hence, activities that are highly interactive, interesting, and challenging should be presented in the class to provide for students' diverse learning needs (Tomlinson, 2006, 1998; & Gardner, 2006).

Another important aspect to meeting the individual needs of learners is to consider the learning process. Deshler and his colleagues at the Center for Research on Learning designed and validated a teaching model based on cognitive learning theory that focuses on providing learners with a structured sequence of steps to accomplish a task or create a written product (Schumaker, Sheldon, Sheldon-Sherman, Schumaker, Sheldon-Sherman, Schumaker, & Lyerla 1999; & Deshler & Schumaker, 1988). The Strategic Instruction Model (SIM) was developed to provide students with mild-moderate

disabilities a consistent, predictable, and memorable frame to apply to a variety of content and instructional exercises. Several SIMs strategies, (e.g. Fundamentals in Sentence Writing Strategy, Proficiency in Sentence Writing Strategy, Paragraph Writing Strategy, and Theme Writing Strategy), were designed to help students learn proficient sentence, paragraph, and theme writing skills by breaking down the writing process into formulaic steps (Schumaker, et al., 1999; & Deshler & Schumaker, 1988). For instance, the Sentence Writing Strategies teach students to appropriately structure the four types of sentences (simple, compound, complex, and compound-complex) in a step-by-step process with easy to remember formulas. In addition, these writing strategies teach students to approach sentence and paragraph development in a step-by-step process with an easy to remember mnemonic. Researchers have found that incorporating research-based instructional strategies enhances student skill acquisition (Deshler & Schumaker, 2006; McRel, 2005; & Marzano, 2001).

Teaching learning strategies effectively to students with mild-moderate disabilities requires a thoughtful approach. Teachers need to use instructional approaches that fully engage students in the learning process. Teaching content should involve sensory and emotional connections to previous knowledge and experiences because those associations enhance students' memory (Gorman & Eastman, 2010; Kabuto, 2009; & Kajs, Alaniz, Willman, & Sifuentes, 1998). Instruction should also require the student to apply the content to a relevant task to provide important practice and to allow the teacher to observe the demonstration of mastery. When teaching new skills, particularly learning strategies that are designed to facilitate future skill acquisition, it is important that the

teacher manage the difficulty of the task, making sure that it is slightly more challenging than tasks that the student can accomplish independently.

While learning strategies provide a critical foundation to learning new content and skills, visual supports are tools that when embedded in the instruction can enhance the understanding and use of target skills and provide cues to environmental expectations, for individuals with mild-moderate disabilities. "Visual stimuli provide a concrete glimpse…" for the formation of mental representations "… that a student can match", eliciting the conceptualization of potential patterns (Black, 1993, p. 2).

Visual supports can also be used to attract and hold students' attention (Rao & Gagie, 2006; Mowat, 2004; & Longo, 2001) and "offer a way [for new information] to become part of one's own culture and to learn" (Hayes, Hirano, Marcu, Monibi, Nguyen, & Yeganyen, 2010, p. 677). Students can benefit from visual structure because tying information to a visual medium will provide students with more opportunity to not only retain but also recall information. In fact, mental representations, formed through visual images, serve as a means of connecting those visual images to words. Visual supports such as bolding and underlining key words, bulleted steps, and strategic empty space on a page can assist, across various age ranges and settings, students' understandings of the required task. Visual supports assist students with mild-moderate disabilities by increasing skills across various areas of learning: content curriculum, behavior skills, social skills, task engagement, independent performance, transition across activities, and response to intervention.

If an individual struggles with verbal language, for example, and it is the only method used for communicating expectations then visual supports can alleviate some of

the individual's struggles. Supports of this nature allow for the use of a particular visual strength to process, organize, remember, and respond to information thereby allowing the individual to participate more easily in the communicative process. Visual supports also enhance the opportunities for information "connectability", for information to emerge more predominantly within the individual's environment, greatly reducing stress levels and potential inappropriate behaviors that individuals may exhibit when unable to effectively communicate.

Children live in a world surrounded with visual and graphic information (Kabuto, 2009). In the age of television, Internet, movies, music, and videos, much of the world presents and advertises information using color as a medium (Kabuto, 2009). It is said that 80% of all the information perceived by humans is visual and 40% of that information is represented in color (Kabuto, 2009; Schraeder, 1997 a, b; & Pruisner, 1993). In fact, colors provide universal connections because "scientific color research reveals that all people relate to color in much the same way" (Lange, 1983, p. 173). That is, color is an important aspect in a person's daily life, regarding information perception because color is suggestive and symbolic (Lange, 1983). For example, people generally associate the color "*red*" with the word "*stop*" because of the red stop sign or red traffic light. When used associatively, using color imagery as clues adds significant dimension to the understanding of information (Leigh, 2010; Keyes, 1993; & Lange, 1983). For instance, "*yellow*" is the color of the "*sun*", symbolically representing "*warmth*". Colorful visuals are a powerful stimulus to learning because they activate emotions and/or previous knowledge. Using color-coding as a visual support stems a preliminary and associative perspective, which helps relational thinking and recall because color

harmonizes current content with previous experience, and color triggers sensations and understandings that help provide visual cues (Longo, 2001 & Lange, 1983). In effect, color-coding, as a visual cue, promotes a continuity for reasoning and constructed meaning of current content (Leigh, 2010 & Longo, 2001).

Color-Coded Enhancement

Using a color-coding approach in combination with research-based writing interventions to distinguish parts of speech and to guide sentence, paragraph, and essay writing can help students to more comprehensively understand the writing process and improve their overall writing skills. Color-coding schemes based upon specific color choices in relation to grammatical function potentially enhances writing component skills because using different colors eliminates confusion among writing components, structures, divisions, and subdivisions of the writing process. For example, using color-coding to see particular subdivisions of writing can enhance a student's comprehension of how writing unites words into sentences and ideas into coherent topics that narrate, describe, persuade, or explain. Thus, adding a color-coding supportive method to a research-based writing strategy may enhance the written expression instruction resulting in better student understanding and skill acquisition for students with mild-moderate learning disabilities. Hopefully, students will realize that writing techniques are not foreign, archaic, boring, or stressful; but instead, an effective way to exercise one's creativity and enhance one's writing capabilities in accomplishment of an original essay paper.

Teaching students to become more proficient writers should be within an action research instruction methodology utilizing an inquiry-based teaching strategy. Adding color-coding as an embedded enhancement to a research-based writing strategy should significantly improve the overall efficiency of the instruction resulting in improved writing performance for students with mild-moderate disabilities. The addition of a color scheme helps to delineate potential frameworks within the writing process and organized structures within the written text. Frameworks help processing and evaluation of complex processes by specifying relations among the elements being studied (Hayes, 2006). Further, frameworks can aide memory by depicting relational elements that are important for understanding complex issues and situations (Hayes, 2006). This reminding of relational elements provides a common language (labels per se) to facilitate acquiring and organizing knowledge (Hayes, 2006). Organized knowledge may potentially embody pragmatic predictions, stemming from derived commonalities (Hayes, 2006). Implications and predictions found within a framework engage readers to use the framework as a guide or blueprint in their quest of analysis and comprehension.

Color-Coding

Six colors (yellow, orange, pink, green, blue, and red) make up the color-coding schematic used in this study. A detailed summary for the color-coding schematic is found in Appendix A. The colors used in within this research study revolve around natural principles:

> *Color Rationale:* Yellow is the main color of the sun, and the sun dictates the amount of light brightening the day. Green is the color of grass, which is constantly growing and dependent upon the sun. Orange

is a color found within the yellow sun giving it more dimension, such as during sunrises or sunsets. So, orange adds to the yellow. Blue is the color of the water which waters the grass for further growth. Similarly, blue adds to the green. Pink is the color of flowers. Flowers grow from the grassy ground and lean in the direction toward the sun. Pink connects yellow and green components. The color red signifies a stopping point since stop signs are red and cars stop when the red traffic lights shine.

Parts of Speech and Punctuation: Yellow is the color of nouns and subjects. Nouns are the main items of information within the sentence, and subjects dictate the main idea of the sentence just as the sun dictates the "sunny-ness" of the day. Subjects lead the sentence. Verbs act as followers in the sentence. Verbs are the color green because they signify action within the sentence just as the green grass grows. Because subjects and verbs must be in agreement for sentence proficiency the colors work together; the grass cannot grow without the sunshine, tying the yellow and green together in a natural manner. Orange is the color of adjectives which describe nouns and subjects, giving more descriptive information and dimension to their existence. Adverbs are blue which further describe the verbs and adjectives relative to the idea that water waters the grass and cools the heat of the sun. Conjunctions are pink because they connect words, phrases, and clauses in the same manner flowers connect the ground to the sky where the sun shines. Red is the color of end punctuation just as the red stop sign signifies a stopping point. Commas and semicolons are pink because they connect words, phrases, and clauses together. Colons and hyphens are green because they signify constant movement in the sentence.

Sentence Proficiency: Yellow is the color of independent clauses just as the yellow sun is independently in the sky. Green is the color of

dependent clauses just as the grass is dependent upon other factors to grow. For example, dependent clauses depend upon the independent clauses to form a complete sentence just as the grass depends upon the sun to grow. Pink is the color of conjunctions and coordinating punctuation which connect simple sentences together in order to develop compound, complex, or compound-complex sentences. Red is the color of end punctuation (period, question mark, or exclamation point).

Paragraph Proficiency: Yellow is the color of topic sentences which lead the direction of the paragraph. Topic sentences define the major components of the paragraph just as the yellow sun defines the day's light. Green is the color of detail sentences which support the topic sentence with information. Detail sentences are actively giving information just as the green grass is constantly active in growth. Pink is the color of transitions which connect the ideas within the sentences and the detail sentences within the paragraph. Red is the color of the conclusion which ends the paragraph with a decisive thought.

Essay Proficiency: Yellow is the color of introduction paragraphs, and they lead the direction of the essay. Introduction paragraphs are similar in reasoning to a topic sentence within a paragraph. Green is the color of detail paragraphs which inform the reader of specific ideas and supportive detail information. Detail paragraphs are similar in reasoning to individual detail sentences within a paragraph. Pink is the color of transition sentences and transition words that connect paragraphs together and sentences together. Red is the color of conclusion paragraphs that bring the topic idea and details to a stop with a summarized end.

Color choices were chosen and matched to specific content significance creating an effective hierarchy of separate informational layers and yet differentiates specific content within the informational layers. The colors work together sequentially and independently to differentiate information.

Current Research & Practice

Research studies indicate that teachers typically dominate classroom conversation, consuming nearly 70% of classroom time with didactic-based teaching formats, but deductive- and inductive-based instructional approaches reverse this trend by placing students at the lead of the learning process and teachers in the role of instructional facilitator (U.S. Department of Education, 2013). This type of learning is based upon investigations from various scenarios for the purpose of developing knowledge. It is learning within an investigation and discovery format as opposed to a memorization of information method of learning. This pedagogical method of learning, founded in constructivist learning theories (e.g. Piaget, Dewey, Vygotsky, and Freire), emphasizes learning that is built upon experience and process. In fact, socially-based constructivist learning scaffolds the development of experimental and analytical skills in pursuit of factual knowledge, supported by forming a hypothesis, collecting information, considering the state of the information, and revisiting the original hypothesis in a reflective manner. This open method of learning allows students to learn and explain what they are learning, reinforcing comprehension because it generates explanations through associations supported by collected evidence.

Teaching has typically involved organizing and conveying large bodies of conceptual and factual knowledge. However, little attention has been given to the process of acquiring knowledge through realistic problem solving tasks. In other words, the primary emphasis has been formulaic methods (First, MacMillan, & Levy, 1995) for solving typical "textbook" problems that are focused on skills in isolation. Activities utilizing critical thinking skills in order to incorporate various skills such as analysis, scaffolding of information, and problem solving should be implemented within the classroom lessons. Instead, much student knowledge is limited to instructional presentations of surface-oriented problems.

Students with mild-moderate disabilities have been taught with traditional writing programs that typically use formats concentrating on discrete skills (First, MacMillan, & Levy, 1995; & Dagenais & Beadle, 1984). Skills that are taught in isolation typically use drill and review of individual skill tasks which only promote singularly narrow linear paths of thinking and processing (First, MacMillan, & Levy, 1995; & Dagenais & Beadle, 1984). This format of teaching has been to the detriment of written communication (First, MacMillan, & Levy, 1995). Skills taught singularly, are difficult for students with mild-moderate disabilities to generalize in other tasks or settings (First, MacMillan, & Levy, 1995; & Dagenais & Beadle, 1984). Moreover, research shows that "special education curricula typically ignore [the] benefits of the writing process approach to written expression" to accommodate a "task analytic perspective" of teaching (First, MacMillan, & Levy, 1995, p. 21). This instructional style "presumes that instruction must progress from the simple to the complex," (Dagenais & Beadle, 1984; as cited in First, MacMillan, & Levy, 1995, p. 21) in order for students to learn and retain

instructional material. These methods of teaching writing instruction typically ignore the communicative practice that writing should encompass as well as the significance of a student's ability to generalize writing skills to other tasks and settings (Dagenais & Beadle, 1984; as cited in First, MacMillan, & Levy, 1995). Providing a useful instructional purpose stems from the development of appealing and interesting instructional strategies with engaging lesson plans.

Adding a color-code schema, based upon specific color choices, in relation to writing components and grammatical function can potentially enhance student awareness to the structure and organization of the written text as well as add interest to the written text. "Art[istic qualities] invites learners to look carefully and deliberately to use their imagination and judgment to solve problems" (Eisner, 2002; as cited in Leigh, 2010, p. 255), so adding color as a symbolic representation to textual information promotes learners to explore the information in multiple ways, without the limiting parameters of black-and-white text. Eisner (2002) "argued that symbolic representation promotes intellectual development and helps learners express meaning rather than merely state it" (as cited in Leigh, 2010, p. 255). Learners can therefore actively construct knowledge by manipulating and interacting with the information (Leigh, 2010). Reflection promotes building and extending already preconceived knowledge (Leigh, 2010); therefore, color-coding text offers students opportunities to select one color over another in reflective decision making. Learning tasks, enhanced with a color-coding schematic, will offer opportunities for learners' acquisition, representation, and assessment of knowledge by promoting students' interactive participation with the content material (Longo, 2001).

Theoretical Perspective

Providing a theoretical perspective, a foundational step in research, will better clarify the viewpoints and assumptions brought to this particular research study. Theoretical perspectives "…reach into the understanding…of what human knowledge is" (Crotty, 1999, p.2). Crotty (1999) defines theoretical perspectives as "the philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria" (p. 3). According to Crotty (1999), without a researcher's identification of a theoretical perspective, readers will be left without insight providing,"…a context for the process and grounds [of] its logic and criteria" (p.7). Well-explained frameworks are important because "different ways of viewing the world shape different ways of researching the world" (Crotty, 1999, p. 66).

Pragmatism is the underlying philosophy of mixed methods research. This philosophy allows the researcher to move between inductive and deductive theory. Therefore, the researcher has the flexibility of multiple design standpoints (Plano-Clark & Creswell, 2008 & Creswell & Plano-Clark, 2007). Pragmatism allows for critical thinking as the researcher works with both specific results and implicit understandings. During data collection and analysis, the pragmatic approach relies on a version of abductive reasoning which allows for the researcher to, "…first convert observations into theories and then assess those theories through action" (Plano-Clark & Creswell, 2008, pp.58-59). The transferability of research data, analysis, and results from one frame of reference to another will aid research results from being analyzed solely in a context-bound frame of reference or from an over-reaching standpoint of being completely generalizable to all populations. Research information will pertain to the one social

context population/phenomenon being studied. Mixed methods research permits a deeper understanding of data reasoning while also sustaining a reflexive viewpoint (Merriam & Associates 2002). As a pragmatic researcher, the information sought and obtained will be related to facts or practical affairs without self bias or opinions; they will be sought within their particular reality. The pragmatic approach permits data to be collected and considered within its practical bearings while guided through the functionality of intelligent thought; truth is preeminently tested by the practical consequences of a particular belief (Merriam-Webster's, 1999).

A pragmatism epistemology will clarify the research investigating teacher's awareness of students' writing skills difficulties. The objective of this research is to determine the impact of an enhanced writing strategy on the writing performance of students with mild-moderate disabilities. As such, this study will also draw from constructivist epistemology by utilizing a critical theoretical perspective, which will allow for the examination of inherent problems (Hesse-Biber & Leavy, 2004) in schooling when dealing with enhanced teaching strategies to maximize student acquisition of target skills. Constructivist research theory allows for learning by: (a) making meaning of various contexts, (b) accessing prior knowledge, (c) by making connections, (d) by processing information, and (e) creating new meanings scaffolding from existing meaning. The main theoretical frameworks of language for learning are: (1) a constructivist view of teaching and learning (looking at knowledge produced by individuals' past experiences and learning), (2) the dimensions of language development (having interrelated aspects), and (3) the individual language functions (the purpose and reasoning for language use). Knowledge cannot be transmitted to students; learners

actively construct knowledge. Teachers should scaffold students' learning so that these students can work slightly above their independent zone of proximal development, playing an integral role in developing independent thinking. Understanding why and how language works will increase teachers' appreciation and application of teaching and learning strategies in order to augment students' opportunities to learn, making connections between their background knowledge and new knowledge. Utilizing this philosophical stance, this study will challenge and empower educators to change teaching and learning contexts in order to better serve a very vulnerable student population.

Research Purpose

The purpose of this study was to determine the effectiveness of an embedded color-coding strategy on the writing performance of adolescents with mild-moderate disabilities. The project goal was to show that the use of visual images and supports, namely color, enhances students' understanding of the writing process and skill development by making written expression patterns more clear, logical, and manageable by simplifying the writing process. Adding a color-code schema to a proven writing strategy will demonstrate that using this visually concrete presentation of information, which incorporates a specific rationale for each color, will promote an inductive style of learning which will improve the writing performance of students with mild-moderate disabilities. To evaluate the actual impact of the embedded color-coding strategy, two comparison groups were used, targeting five classes at two different grade levels. That is, comparisons of students' writing products were made between those students who

learned the English lessons through the use of an embedded color-coding strategy and those who learned the English lessons without the embedded color coding strategy.

This study employed a mixed methods research model. Quantitative data was collected on student demographic data and individual and group data from pre- and post-writing assessments. Concurrent with the collection of quantitative data, observational and open-ended survey data was used to explore students' comprehension and perceptions of writing components. Collecting quantitative and qualitative data brings together the strengths of both research forms as well as validates the quantitative results with richly thick, descriptive qualitative data. For this study, the following research questions were addressed:

1. Does color-coding improve student written expression skills in the area of conceptual development?
2. Does color-coding improve student written expression skills in the area of organization and written fluency?
3. Does color-coding improve student written expression skills in the area of grammar and mechanics?
4. Does color-coding improve a student's self-confidence and desire to write and create original written works?

CHAPTER II

REVIEW OF LITERATURE

Writing, a complex and misunderstood process, is a challenge for all students. According to Persky, Daane, and Jin (2003), 70% to 75% of students struggle with writing. Universities report that nearly 50% of incoming freshman are unable to write at the college level (Achieve Inc., 2005). American employers view writing proficiency as an essential skill (National Commission on Writing, 2004). Clearly, writing instruction for all students needs priority status.

Hayes (1996) believes that writing is a form of communication within the social environment that stresses the sharing of read or heard ideas with others. In that process, cognitive activity intersects with individual motivation to create understandings effectively shared with others (Boyle & Scanlon, 2010). Thus, an individual's ability to use reflection enhances their facility in communicating those ideas, whether verbally or in the written form.

Effective writers use strategies to organize their thoughts and to apply their written text successfully (Kabuto, 2009; Schraeder, 1997 a, b; & Urowitz & Bozzato, 1992). Urowitz and Bozzato (1992) named three interrelated communication skills as

key to effective written expression: cultural understanding, organization of communication, and reasoning and meaning-making of individual perceptions. "Grammatical words relate to the organization of thought, [and] rhetorical words relate to the organization of communication" (Urowitz & Bozzato, 1992, p. 1). Grammar use is simply the organization of language. That is, students need to see word arrangement in order to more fully understand word usage (Schraeder, 1997 a, b & Urowitz & Bozzato, 1992) and need to see the direction in which word placement drives communicative meaning (Dyson, 2007, & Urowitz & Bozzato, 1992). In addition, Dyson (2007) states that effective writing, within various styles (descriptive, narrative, persuasive, and expository), is also the successful ability to write comprehensively, conveying ideas, and transferring information from one to another in a clear and concise manner. It is a complex process that involves analysis of text, organization of information, structuring of sentences and paragraphs, and correctly applying grammar and spelling rules.

Writing Problems Commonly Demonstrated by Students

Writing is a complex task drawing on a range of cognitive, language, motor, and social skills (Graham & Harris, 2009). Given this highly complex and demanding process of rules and mechanics that one must navigate, it is not surprising that, many children struggle with writing (Graham & Harris, 2009). Complex effects are evident at word-, sentence-, paragraph-, and text- levels of language (Graham & Harris, 2009 & McArthur & Graham, 1987). Various factors such as audience, purpose, organization, structure, perspectives, and points of view while communicating information are critical for writers in order to become resourceful and reflective regarding writing improvement. Writing

must be flexible and goal-oriented in order to scaffold various cognitive processes and strategies for planning, text production, and revision. Effective acquisition and application of grammar and mechanics skills are critical for students to satisfactorily compose written informational text. Skilled writers, as noted by Flower and Hayes (1980), "possess the ability to monitor and direct one's own composing processes" (p. 39) while engaging in purposeful and active self-direction processes and strategies (Harris & Graham, 1992). Research on writing has been an important factor in the understanding and improving of students' writing abilities (Harris & Graham, 1992).

Students, regarding writing skills, are typically described by their interest or indifference toward writing components. Research indicates that affect (students' attitudes, beliefs, and emotions) needs to be considered when students are experiencing writing difficulties (Harris & Graham, 2007; & Graham & Harris, 2005, 2003; Klassen, 2002). The acquisition of skill is fraught with difficulty for many students because of existing background knowledge differences and various learning styles. So, teaching approaches to enhance adolescent writing skills should address content material from students' interests, perspectives, and learning styles. Also, students typically think of writing as a right and wrong methodology (Harris & Graham, 2007; & Graham & Harris, 2005, 2003) since they typically learn about the writing components as sets of discrete skills (First, MacMillan, & Levy, 1995). Besides struggling with the individual writing components, these students also typically struggle with organization of the written text (First, MacMillan, & Levy, 1995).

Students with mild-moderate disabilities experience difficulties in writing which creates feelings of frustration and inadequacy, hindering further motivation to continue

(Lewis et al., 1998; as cited in Boyle and Scanlon, 2010; Lipstein & Renninger, 2007; Harris & Graham, 2007; Graham & Harris, 2003, 2005; & Lewis, Graves, Ashton, & Kieley, 1997). Piaget (1966) theorized that individuals support concept development through relationship identification and interaction with content material. For example, when learning about sentence structure, students will learn that a compound sentence is constructed with two independent clauses and a conjunction. They will realize that the conjunction is always between two independent clauses, and that it (the conjunction) can be interchanged with a semicolon, producing the same type of sentence— a compound sentence. For all intents and purposes, students with mild-moderate disabilities struggle with the primary elements of written composition: grammar and mechanics and information organization.

Grammar and Mechanics: Writing components begin with foundational information, the parts of speech, and extend to building paragraphs. Normally, students who struggle with the individual foundational aspects of writing, will also struggle with the purpose of when or where to use the individual components within sentences, paragraphs, or essays. Each part of speech explains not what the word is but how it is used. For example, a word that is used as a noun in one sentence can be used as a verb or adjective in another sentence. Understanding the individual parts of speech can ease the comprehension of the parts of a sentence by building phrases and clauses. The parts of a sentence are not directly corresponding to the parts of speech. The parts of a sentence are reflective of how people construct sentences from the smaller pieces, the parts of speech.

Using phrases and clauses to build meaning by carefully arranging them in particular orders will enhance the information through various sentence structures: simple, compound, complex, and compound-complex. For example, two independent clauses can be arranged to form a compound sentence or one independent clause and a dependent clause to form a complex sentence. Sentence information can be built much more interestingly with sentence structure variations. Appropriating various sentence structures can also make the topic ideas more clear.

"Learning to write", as stated by Boyle and Scanlon (2010), "is a difficult process for students with disabilities" (p.228) because it involves more than merely transferring personal ideas or inner conversations into written words. It involves a mastery of, at minimum, lower level grammar skills while simultaneously using higher-order processing skills to plan and organize ideas to put on paper (Boyle & Scanlon, 2010). Many students may know the definition of particular parts of speech (e.g. nouns, verbs, adjectives, adverbs, etc); they may not be able to arrange them effectively or persuasively (Urowitz & Bozzato, 1992). Moreover, they struggle with effectively applying more complex aspects of writing organization to use and vary simple, compound, and complex kinds of sentences (Urowitz & Bozzato, 1992). Boyle and Scanlon (2010) emphasize that students with mild-moderate disabilities typically write essays paying little attention to higher-order processes of strategic planning and organization focusing on the lower-level skills of grammar mechanics instead. They hypothesize that students who typically focus on lower-level grammar skills do so because these skills were taught as isolated repeat and review drill lessons (Boyle and Scanlon, 2010; Lipstein & Renninger, 2007; & First, MacMillan, & Levy, 1995). Although students may be able to reiterate specific

grammar lessons in a declarative fashion, they have no procedural knowledge of the grammar mechanics (First, MacMillan, & Levy, 1995). In practice, students with mild-moderate disabilities tend to focus on concepts in isolation and find it difficult to generalize concepts to other settings (First, MacMillan, & Levy, 1995).

Written Text Organization: Paragraph structure encapsulates the topic idea with a fact and example support system of information. Appropriately structured paragraphs bring order and purpose to a group of sentences. The order and purpose of sentences are important to best present the expository or descriptive information, narrative ideas, or reasoning of an argument. For example, factual information emphasizing the main idea can be presented first, followed by an example to support the main idea. Students with mild-moderate disabilities do not normally distinguish the intrinsic properties of the informational text but instead rely on given standard textbook patterns. Attempting to differentiate information in order to designate particular paragraph structuring may cause many struggles for these students (Schraeder, 1997 a, b). For example, students with mild-moderate disabilities may be unable to appropriately distinguish information structures portraying given facts from fallacy or distinguish different segments of information when presented comparatively. Often these students either lack adequate prerequisite skills for composing paragraphs and/or essays or appropriate planning and composing writing strategies.

Writing involves organizing information and elaborating upon ideas. Writing fluency is the natural flow and organization of written words into a completed written product. Fluency can be thought of as individual components considered to add to the

ease and 'enjoy-ability' of reading written text. For example, sentences that are smooth and expressive use a variety of sentence beginnings and reflect variety in sentence length and structure, bringing fluency in expression of ideas. Students with mild-moderate disabilities often experience difficulty with writing fluency when they struggle with organization of idea development. These students lack knowledge in appropriately organizing text into logical structures. It is theorized that students with mild-moderate disabilities struggle with writing sentences, paragraphs, and essays because they have trouble transcribing ideas into words due to a limited knowledge of the writing process (Harris & Graham, 1992).

Constructing responses into the written form has been an issue for students in general but an impediment for students with mild-moderate disabilities as evident from not only teachers' reporting of class coursework and assessments but also state assessment reports. "The National Commission on Writing (2003) points out that while most students have mastered the basics, few can create prose that is 'precise, engaging, and coherent'" (p.16; as cited in Applebee & Langer, 2006, p, 2; & U. S. Department of Education, 2003). Of the fourth, eighth, and twelfth grade students who completed the writing assessment conducted by the National Assessment of Educational Progress (NAEP) (Boyle & Scanlon, 2010 & Harris & Graham, 2007), only 34% of all students passed the essay writing assessment at or above the proficient level (Boyle & Scanlon, 2010; U.S. Department of Education, 2013; & U. S. Department of Education, 2003). Students with mild-moderate disabilities who took the NAEP, "performed worse on this measure when compared to national peers" (Boyle & Scanlon, 2010, p. 222 & U. S. Department of Education, 2003). The NAEP study reported that 43% of the fourth grade

students with a disability, 53% of the eighth grade students with a disability, and 70% of twelfth grade students with a disability scored "below the basic level in writing" (U.S. Department of Education 2003; as cited in Boyle & Scanlon, 2010). These scores, derived from the essay writing assessment were scored upon three types of essays: narrative, informative, and persuasive which only supports further this literature review inquisition – that students with mild-moderate disabilities need to develop better writing skills.

Writing Struggles: Students with mild-moderate disabilities have writing problems that run the gamut from lower-order mechanical skills to higher-order strategic thinking processes (Boyle & Scanlon, 2010). In effect, these lower-level skill deficits negatively impact cognition which results in poorly constructed written products (Boyle & Scanlon, 2010). Researchers have consistently found that students with mild-moderate disabilities are not strategic during their planning stages of composing written work (Boyle & Scanlon, 2010; Ellis & Colvert 1996; & MacArthur & Graham, 1987). That is, they do not overtly select and apply tools to assist them in planning, organizing, and creating effective written text. As a result of their haphazard approach to writing, students with mild-moderate disabilities are more likely to write personal accounts of information, rambling on and on, rather than well-developed schema of information.

Students with mild-moderate disabilities also experience difficulties comprehending and writing expository prose unless they know how "…to identify, represent, synthesize, and organize ideas" (Englert, Mariage, Okolo, Shankland, Moxley, Courtad, Jocks-Meier, O'Brien, Martin, & Chen, 2009, p.147). The inabilities to

categorize, classify, or outline topics and subtopics into various segmented orders may hinder topic narrowing and focus. Students' ideas may not be appropriately understood due to a lack of sentence and transition structural skills. So, students' fluency and completeness of ideas may be affected due to the poor use of transitional words and phrases. Also, the ineffective use of organizational strategies can impact students' expository writing because ideas may not be presented in a coherent order. Further, the reporting of ideas is much dependent upon the writer's attitude. An inability to distinguish various tones and tenors in relation to the effective use of "*action word*s" may hinder the presentation of information. Students with mild-moderate disabilities may not understand how to organize their overall writing into commonly used essay structures that normally include introduction, body, and conclusion paragraphs. The alignment of topic ideas into the different paragraphs may be grouped inappropriately. Writing the first and last sentences in a paragraph or the first and last paragraphs in an essay may be difficult if students are not able to differentiate or compare ideas logically. Many students with mild-moderate disabilities, experiencing difficulty organizing and expressing their ideas concisely and clearly, require a way to connect with their topic (Sofia, 2010; Lipstein & Renninger, 2007; & Schraeder, 1997 b) and visualize the funneling (narrowing the focus) of topic ideas. Because text structures govern informational text, an understanding of information structure would help students deduce and construct knowledge based upon delineated main ideas and the related details that support the main ideas (Englert et al., 2009). In effect, an understanding of information placement and logistics, using both informative and supportive information, will allow

the student writer to express his or her ideas in order to fully communicate the intended purpose.

Existing Learning Strategies

"Teachers need strategies to help students learn meaningfully" (Longo, 2001, p. 2). Teachers instructing students with mild-moderate disabilities call for best practice strategies and differentiated methods to help students organize, process, and assimilate material to current knowledge in order to learn the new content material (Sofia, 2010 & Longo, 2001). Organization of instructional content within a methodical and regulated manner helps these students to recognize informational associations. The ability to delineate associations enhances reconstruction of content material. Research has found that students learn and retain more instructional information when relationships between facts and meaning are logically categorized and structured for processing (Sofia, 2010; Marzano, 2005, 2000; Kabuto, 2009; First, MacMillan, & Levy, 1995; & Dagenais & Beadle, 1984). Students with mild-moderate disabilities encounter various writing problems, so instructional strategies have been developed to enhance classroom instructional practices that are supportive of students' interests, instructional presentations that engage students mentally and physically, and using research-based teaching models.

Instructional Practice: Instructional practices that engage students will promote further learning. Because students should be able to clearly articulate statements of generalizations and principles including providing numerous examples and clear

misconceptions about them, Marzano (2005 & 2001) suggests that classroom instructional practices be related to nine research-based categories of instructional strategies: identifying similarities and differences; summarizing and note-taking; reinforcing effort and providing recognition; homework and practice; nonlinguistic representation; cooperative learning; setting objectives and providing feedback; generating and testing hypothesis; and cues, questions, and advance organizers. Using these classroom practices will enhance learning, as evident by the high effect size increases found in a meta study of more than 25 years of teaching (Marzano, 2005 & 2001). Teaching literacy should be developmental and constructed, teaching skills that work as a system (Sofia, 2010; Kabuto, 2009; Dyson 2007; & First, MacMillan, & Levy, 1995; & Dagenais & Beadle, 1984); it is using patterned associations and concept relationships (Marzano, 2005). Writing instruction is more than what the literacy curricula normally addresses; it is more than narrow and linear isolated skills (Kabuto, 2009; Johannessen, 2004; & First, MacMillan, & Levy, 1995). Many students struggle with linear processes or retaining information (Paxman, 2011 & Kabuto, 2009) because information in generic outline formats does not show relational evidence. Many researchers correlate learning and writing skills with controlled processing of linguistic domains (Kabuto, 2009). Systematic, explicit, interactive instructional presentations utilizing categorization teaching techniques could enhance students' content learning; (Kabuto, 2009; Dyson, 2007; & Marzano, 2005, 2001) therefore, students benefit most from modeling, practice, and inferential thinking (problem solving) when acquiring new skills in conjunction with the nine research-based instructional strategies (Marzano, 2005, 2001). Perceiving relational qualities within informational text, rather than didactically

receiving the information, is believed to help reorient the learner to new concepts (Marzano, 2005, 2001; First, MacMillan & Levy, 1995; & Black, 1993). Writing specialists suggest that effective writing instruction, skills taught developmentally rather than as an itinerary of grammar rules and policies, will enhance students' performance on writing assessments (First, MacMillan, & Levy, 1995). That is, writing should be taught as a communicative model process (First, MacMillan, & Levy, 1995) rather than as individual skill domains put together to form one process.

Dewey (1913) noted that "teachers cannot make a student interested in subject matter, [but] they can support students' abilities to make connections between their prior experiences and materials to be learned" (as cited in Lipstein & Renninger, 2007, p. 113). Pedagogical choices that a teacher makes can influence greatly student attitudes toward learning and collaboration (Lipstein & Renninger, 2007). Through teachers' pedagogy, learning environments can be constructed. Establishment of a context in which students more readily identify and associate with will help students develop analytical skills and by extension enhance their "*meaning-making*" ability (Lipstein & Renninger, 2007). Thus, teachers who provide a supportive academic and social environment can work toward changing students' attitudes and affect toward learning (Bruning and Horn, 2000), helping students feel positive about learning and become more engaged. Moreover, students who can relate the content material to realistic possibilities outside the classroom are more likely to work hard, seeking feedback toward improving their skills (Lipstein & Renninger, 2007). Teachers' classroom practices can influence students' interest in the content material, whether they will develop or deepen an interest to learn the material, such as writing (Lipstein & Renninger, 2007).

The apathy associated with students' interest in learning how to improve their writing is typically attributed to someone else's decision about what should be of importance to the students (Lipstein & Renninger, 2007). The more choices that are given to students, the better their writing will become (Bush & Zuidema, 2011) as well as their interest for constructive feedback. Interest refers to students' engagement; interest in learning is determined by students' connections made to the content material. Meeting students' interests, while supporting their learning needs, can help shift students' responsiveness to writing (Thompson, 2008 & Lipstein & Renninger, 2007). First, students who are supported will expend effort to review their writing in pursuit of "improve[ing] their abilities as writers" (Lipstein & Renninger, 2007, p. 135). Second, students who develop their writing skills will feel more positive about their writing ability and by extension their "interest for writing will grow" (Lipstein & Renninger, 2007, p. 138). Hidi and Renninger (2006) support the ideal of connections to the particular writing content helping students to process information (as cited in Lipstein & Renninger, 2007). A student's interest in particular writing topic areas stems from not only his or her connections with the subject matter but also with his or her interactions with the subject matter (Lipstein & Renninger, 2007). Consequently, teachers' pedagogical choices influence "whether students are likely to develop and deepen their interest for writing" (Lipstein & Renninger, 2007, p. 135).

Instructional Presentation: Instructional presentation factors also positively influence students' learning (Johannessen, 2004). Emphasizing the importance of instructional skills, Marzano (2005) states, "A teacher's skills and knowledge base are the most

powerful variables in the classroom" (p. 1). Likewise the use of students' knowledge base can also be quite powerful in aiding their comprehension of organized content material. Feedback from the students, about their prior background knowledge, aids teachers' preparation of instructional presentations (Marzano, 2001). Engaging presentations can activate interactive discussions leading to improved recall and student learning (Jewitt, 2007 & Longo, 2001).

Learners receive and store knowledge in a linguistic manner by reading or hearing lectures, and they process and construct knowledge in a nonlinguistic manner through visual imagery (Marzano, 2005 & 2001). Using both linguistic and visual meanings to present knowledge helps students perceive information and construct concept formations, which promotes not only long-term retention but also meaningful learning and achievement (Longo, 2001). The more students use both systems of representing knowledge (linguistic and nonlinguistic), the better they are able to think about and recall what they have learned. Thus the manner in which information is presented can positively affect not only the learning process but also content comprehension.

Various presentation strategies exist to help with content retention and later recall through the use of organization and classification of similarities and differences and through the use of prior and current knowledge. Using strategies that require students to classify and categorize information have been found to enhance content analysis, retention, and recall (Marzano, 2005 & 2001). From "*KWL"* charts that outline specifics for students to document to Venn diagrams, that depict specific areas for students to categorize information to Contract-2 which helps students compare and contrast new and existing knowledge to integrate new information with prior background knowledge.

These research-based strategies work for all learning styles. Gathering information in this visual manner will allow for more inductive-based reasoning, helping students to quickly access information that facilitates their processing of learned content.

Research-Based Instructional Models: Research-based instructional models assist student learning in a methodically organized manner. Instructional models that emphasize writing as a process can help students distinguish and learn various writing components and apply these individual components to a writing assignment, forming an organized sequence of writing tasks. Instruction in the writing process improves individual writing skills and the quality of written compositions of students with mild-moderate disabilities (Graves, Valles, & Rueda, 2000). A structured and sequential development of individual writing skills will facilitate the learning process of composition writing. Fluency in writing skills will enhance the writer's ability to revise written products. Research indicates that students who engage in a step-by-step process to produce written products become purposeful in selecting and developing structural, contextualized meaning (Graves, Valles, & Rueda, 2000; & Schraeder, 1997 a, b).

Many of these instructional models facilitate appropriate writing techniques that further guide students' learning. Writing intervention models that emphasize metacognitive knowledge in order to guide self-regulation and text structure knowledge in order to guide idea organization enhance students' written expression skills (Englert & Mariage, 1991). Cognitive models assist students to shape and develop ideas within a process-oriented style, enhancing their learning of how to improve writing skills (Graham & Harris, 2009).

The writing abilities of students with mild-moderate disabilities has been targeted by instructional interventions that use scaffolding techniques that rely on metacognitive prompts, techniques that derive from Vygotsky's 1962 (a, b) research and analysis of the origins of higher psychological functions. Considered most significant and demonstrably effective instruction, writing interventions for students with learning disabilities have resulted from the application of the Self-Regulated Strategy Development (SRSD) model which is grounded in cognitive models that view writing as a self-directed problem-solving process (Guzel-Ozmen, 2006).

The SRSD instructional approach, designed by Graham and associates, focuses on composition and self-regulation strategies (Guzel-Ozmen, 2006) as well as the self-regulation of planning and revising procedures, within a very strategic approach to learn (Graham, Harris, & Larsen, 2001) because SRSD instruction was designed to promote students' independent writing skills (Guzel-Ozmen, 2006). The primary goal of SRSD interventions is to avert potential writing deficits and limitations by providing different types of explicit support to struggling writers (Guzel-Ozmen, 2006 & Graham, MacArthur, Schwartz, & Page-Voth, 1992). Teachers provide explicit support for learning specific strategies, model the strategy's use and then over time the teacher will begin to relinquish control to the student, who will assume greater responsibility for monitoring that particular strategy's application (Guzel-Ozmen, 2006).

Students well versed in this model have shown improvement in not only the quantity of their written efforts but also in the quality of their writing (Danoff, Harris, & Graham, 1993; as cited in Guzel-Ozmen, 2006; De La Paz, 2001,1999 a, b; De La Paz & Graham, 1997; Graham & Harris, 1989; Graham & MacArthur, 1988; MacArthur,

Schwartz, & Graham, 1991; Sexton, Harris, & Graham, 1998; Stoddard & MacArthur, 1993; Troia, Graham, & Harris, 1999). Average effect size for students' writing skills was 1.14 for quality, 1.86 for textual length, and above 2.0 for structural elements in a meta-analysis of SRSD writing studies (Graham & Harris, 2003; as cited in Guzel-Ozmen, 2006). SRSD instruction scaffolds skills so that students gradually become more responsible and independent in using writing strategies and self-regulating procedures (Guzel-Ozmen, 2006).

Efforts to promote the argumentative writing of students with learning disabilities through the application of the SRSD model have produced dramatic improvements in the quality of students' essays and the production of argumentative discourse (introduction to the problem, the author's premise, reasons to support the premise, the counter-position, reasons to support or not support the counter-position, examples for clarifying specific points, and a conclusion; Graham et al., 1992; Sexton, Harris, & Graham, 1998; & Graham & Harris, 1989). Applications of the SRSD model have generally been concerned with increasing the production of essays for students who were unproductive before instruction. Although SRSD studies use a variety of outcome measures, the most commonly used measures assess the number of functional elements produced by a writer (Graham et al., 1992).

Graham and Harris (1989) conducted a seminal study of the effects of SRSD instruction on the argumentative writing of students with learning disabilities using a particular writing strategy, the TREE strategy. The TREE strategy (topic, reasons, examination, ending) prompted students to provide a topic sentence, reasons for their opinion, examine the reason from the audience's perspective, and provide an ending

(Graham & Harris, 1989). The results showed that the strategy had a positive effect on their writing and self-efficacy as writers (Graham & Harris, 1989). Students writing proficiency in argumentative essays, the inclusion of basic elements of argumentative discourse, increased from 7% to 80% and the essays were also longer and judged to be of a higher quality than prior to instruction (Graham & Harris, 1989).

Sexton, Harris, and Graham (1998) replicated the work of Graham and Harris (1989). Using the same TREE strategy; Sexton, Harris, and Graham (1998) conducted research that revolved around teaching fifth and sixth grade students how to write argumentative essays because they realized that students lacked academic motivation and effort. Prior to instruction, students spent little or no time planning their essays with approximately three functional elements per essay which were judged to be of poor quality. Post instruction, students' efforts resulted in more than a 200% increase in the total number of functional essay elements and holistic quality of their essays (Sexton, Harris, & Graham, 1998). Similarly, Graham et al., (1992) continued and furthered Sexton, Harris, and Graham's research of 1998 to include a different strategy while using the SRSD model. The PLANS strategy (pick goals, list ways to meet goals, and make notes, sequence notes) included process and product goals in order to provide structure to the tasks of writing arguments. The PLANS strategy was designed to enable students more appropriately to self-regulate the planning processes and organize task relevant information. Prior to instruction, these students averaged only four argumentative elements per essay, but after instruction, they averaged more than seven elements per essay. Only 21% of the students' essays contained all of the elements of argumentative discourse before instruction, yet more than 89% included all of these elements (Graham

et al., 1992). After instruction, essays were also longer, more coherent, and of higher quality (Graham et al., 1992).

The cognitive writing model, the Hayes-Flower writing model, is a widely accepted and popular model of the writing process that was created to help improve written expression. This model, initiated in 1980 and revised since then, emphasizes two major components: 1) task environment, the outside influences on students' writing; and 2) the individual, the various influential factors within the individual (Hayes, 1996 as cited in Boyle & Scanlon, 2010 & Hayes and Flower, 1980).

The Hayes-Flower writing model was applied to children with three key differences from its application to adult writers. First, model modifications were made to explain the developmental process of writing because school children are not proficient writers; they are learning to write (Boyle & Scanlon, 2010 & Berninger & Swanson, 1994). Second, the lower level writing skills of transcription had to be added to the model because it is difficult for children learning about handwriting and spelling to coordinate these skills with higher level skills (Boyle & Scanlon, 2010 & Berninger & Swanson, 1994). Third the model needed to reflect the different skills children bring to the writing process; it needed to take into consideration writing deficits in order to use theories describing writing within a cognitive framework (Boyle & Scanlon, 2010 & Abbott & Berninger, 1993). One of the major areas of emphasis within this model is the incorporation of visual-spatial and linguistic components. Students retrieve from their memory various pieces of information which rely heavily on visual and spatial memory, generating ideas and stemming initial planning and organization of information (Hayes, 1996; as cited in Boyle & Scanlon, 2010). Students write paragraphs and/or essays using

three main processes according to the Hayes-Flower model: planning, translating and reviewing. These processes, per Hayes, are stressed as a recursive process where students write, revise, and edit during multiple stages (1996). In fact, Berninger, Abbott, Whitaker, Sylvester, & Nolen (1995) have supported the planning and translating components of the Hayes-Flower model. Berninger et al. (1995) stressed that students struggle in translating ideas into written text, especially regarding the organization of ideas, details, and sentence structures.

Another cognitive writing model is the Cognitive Strategy Instruction in Writing (CSIW) model, developed by Englert, Raphael, Anderson, Anthony, and Steven (1991). This instructional writing model provides a collaborative structure to help generate writing improvement (Guzel-Ozmen, 2006 & Hallenbeck, 2002) because it employs four principles in guiding writing skills' improvement: holistic enterprises, engaging in "think-alouds", interactive dialogue, and "think sheets" with the understanding that writing instruction will revolve around authentic purpose writing (Guzel-Ozmen, 2006; Englert & Mariage, 2003; & Hallenbeck, 2002). Holistic engagement involves planning, organizing, writing, editing, and revising strategies for writing. "Think-alouds" incorporates modeling of thinking and reflective thought to scaffold already mastered skills and thinking with newly learned skills and reflective thinking in order to enhance the writing assignment. Interactive dialogues incorporate teachers' use of prompts to scaffold and guide students' dialogue. "Think-sheets" are structured worksheets that support students' procedural knowledge through the use of graphic organization, prompts, and questions that help cue students' application of skills. Authentic purpose writing is a collaborative manner in which the writer appreciates the social nature of

writing by writing topics of concern, for real audiences (Guzel-Ozmen, 2006; Englert & Mariage, 2003; & Hallenbeck, 2002). This form of writing instruction, a cognitive oriented approach, helps to support students' composing process when writing because students' choice and ownership are emphasized (Guzel-Ozmen, 2006).

Students, instructed through the use of CSIW have demonstrated better writing performance and greater metacognitive knowledge regarding writing components (Englert, Raphael, & Anderson (1992). Students' performance has improved in other courses regarding writing tasks (Hallenbeck, 1997, 1996). Guzel-Ozmen (2006) maintains that other studies are reflective of students adapting the CSIW to improve their academic written performance in other courses (Guzel-Ozmen, 2006 & Hallenbeck, 1996). In one study, for example, four 7th grade students, of Caucasian ethnicity, attending middle school, located in a rural upper Midwest area that is located 25 miles from a metropolitan area, were provided instruction in writing utilizing the CSIW model (Hallenbeck, 2002). Pre- and post-tests revealed significant growth in three of the four students' expository writing skills (Hallenbeck, 2002). The promotion of skills scaffolding assisted students' comprehension of writing components. In another study, four other students, of Turkish ethnicity and age range from 13 to 17, improved skills in the areas of structural elements, coherence, and quality of text. Although a modified version of the CSIW model was used, it still resulted in substantial improvements in students' written expression skills (Guzel-Ozmen, 2006). All the students from both studies were performing well below grade level in written expression.

The Strategic Instruction Model strategy (SIM), another process-oriented instructional model, emphasizes the use of students' self-regulation during writing

processes. This strategy, that was developed over 30 years ago by researchers at the University of Kansas, was initially created to help students with learning disabilities succeed in their classes (Deshler & Schumaker, 2006, 1988). Specific cognitive learning strategies were developed to help adolescents experiencing academic struggles in reading and writing. These students often move into secondary education with elementary-level reading and writing skills increasing their risk for school failure (Deshler & Schumaker, 2006, 1988). More strategic approaches to learning can help students who experience difficulty with content-area classes, such as history and science, experience more academic successes by accommodating different learning styles and providing teachers with routines and strategies for students' learning that will help meet the needs of diverse learners (Deshler & Schumaker, 2006, 1988). Within SIM, there are learning strategies related to six areas: reading, storing and remembering information, expressing information, demonstrating competence, social interaction, and mathematics (Deshler & Schumaker, 2006, 1988).

In essence, cognitive strategy research supports that drawing from various perspectives on learning collaboratively blended with direct instruction will provide struggling writers more access to differentiated thought processes, enhancing their reflective thinking and processing (Hallenbeck, 2002). Cognitive strategies research also supports that teaching and learning strategies promoting developmental skill processes rather than stringing together individual skill proficiencies to create one composite mastery reflect more student participation and self-regulated interests in skill acquirement (Hallenbeck, 2002; Marzano, Gaddy, & Dean 2000). Referring back to the intensive case study of four student participants in a direct instruction with collaborative mentoring that

investigated seventh graders with learning disabilities in an upper Midwest rural consolidated school, pre- and post-test assessments revealed significant growth in three of the four students' expository writing (Hallenbeck, 2002). Although the fourth student did not reveal significant growth per his pre- and post-tests, his writing samples and comments regarding learned content did reveal steady growth. (Hallenbeck, 2002). Thus, potential to enhance writing skills has been revealed with the use of meta-cognitive writing strategies and teacher mentoring (Hallenbeck, 2002). Despite the disability hindrances, strategies with the cognitive constructivist approach to learning do enhance learning and steady academic growth.

Interactive Communicative Instruction

"Communication can be understood as a product of people's active engagement" (Jewitt, 2007, p. 275). Communication today has become a multimodal transference with increases in visual information (Kabuto, 2009; & Jewitt, 2007). Arrangements that make communication visual provide both teachers and students various prospective opportunities for making meaning out of the given information (Jewitt, 2007). Textual information can be communicated spatially through a strong physical presence, through multimodal presentation (Kabuto, 2009; Thompson, 2008; Jewitt, 2007; Longo, 2001; & Farrar, 1991). "Multiple forms of literacy through various modes of meaning-making" help students connect and engage with the content in various manners (Thompson, 2008, p. 144). Interactive textual communication lend to multimodal presentations that encourage instructional imagery in order to depict patterned arrangements, encouraging opportunities for critical thinking, and by extension enhancing content comprehension.

Modalities Enhance Content Presentation: Multimodal experiences of content information will strengthen internal connections to the learned content (Thompson, 2008; Longo, 2001; & Kajs et al., 1998). Using multimodal presentations extends students' associational networks of information (Anderson, 1992, as cited in Longo, 2001). The role of multi-modal learning tasks from lesson presentations offering opportunities for "… learners' acquisition, representation, and assessment of knowledge" (Longo, 2001, p. 4) will enhance students' interactive participation with the content material. Information can be reorganized in various communicative formats and expanded upon to make meaning through analysis and interaction with and around text (Thompson, 2008). Reconstruction of previous knowledge occurs with more ease when diverse functional multimodal applications are involved in the original presentation and processing of the content material.

Learning new concepts, for instance, within a visual modality can potentially bring learning into a new transformative process because it can engage students in a manipulative manner, encouraging questions and discussions (Moody, 2012). According to Kress and Van Leeuwen (2002, 2001), all communication is multimodal. In a literary context, the literary text is also multimodal since the wording of a piece of literature involves the modes of typography, color and layout (or the mode of sound if recited orally; Kress & Van Leeuwen, 2002, 2001). Modality of a given visual image can depend upon the color-coding orientation of the image and communicative context in which it occurs (Kress & Van Leeuwen, 2002, 2001). In other words, the color-coding orientation is the standard or parameter against which judgment and reasoning of orientation meaning is measured. For example, bolded words within a textual document

relay a message of importance to the reader whereas the use of Times New Roman font on a plain white background to create text emphasizes the visual plainness of the text.

Purely linguistic teaching and learning does not provide student engagement with the content material, only student participation regarding the material. In order to better enhance meaning-making, educators should move from simply transferring textual information, a concept students must create as a mental image, to offering visual information, a percept that students transform from a visualization because concepts are formed through somebody else's thought process whereas percepts are thoughts perceived by the senses (Kress, Jewitt, Ogborn, & Tsatsarelis, 2001; Lemke, 2000; Kress & Van Leeuwen, 1996; & O'Toole, 1994). Because perceptions enhance thought processing and assimilation of information, content learning should be presented within multimodal parameters (Kress et al., 2001; Lemke, 2000). Students need to do more than simply hear the material with their ears; they need to use their eyes and hands to touch and manipulate the informational material.

Visual communication, in short, is the social production of systems of signs and meanings as a multimodal phenomenon (Lemke, 2000; Kress & Van Leeuwen, 1996; & O'Toole, 1994). Learning tasks that involve visual perspectives to be manipulated generate higher order thinking and promote further learning (Jewitt, 2007). For that reason, students need to interact with the content material in order to better appreciate the communicative potential within various arrangements and make meaning. Through the visual arrangement of textual writing, the identification of ideas and relationships between concepts can be constructed. Furthermore, text that is presented in a multimodal

manner offers students opportunities to navigate through and potentially reorganize content material which presents new motivation for student involvement.

Journalism classes, for example, teach not only the written portion of creating news stories but also the layout of a news story and coinciding picture (Kaufer & Butler, 2000). The instructional emphasis is not on the medium of passing information but the aesthetics of multimodality, integrating image and words, verbal narrative and visual design (Kaufer & Butler, 2000). In utilizing a multimodal pedagogy to teach news writing, students were encouraged to transfer their analysis of the visual text to the printed text.

Students generally find continuous activity more supportive of processing, learning, and retaining information. Students tend to prefer doing something, being an active participant. In fact, they tend to find this more interesting as opposed to being told about new information to be learned, thus becoming a passive learner (Lipstein & Renninger, 2007 & Johannessen, 2004). Interactive participation with content material allows students to use their own resources to solve problems, enhancing their interest in learning (Lipstein & Renninger, 2007 & Johannessen, 2004). Putting learned content skills into practice will also allow for incorrect or imperfect learning to be revealed to the student and to the teacher, denoting the content necessitating re-teaching. Activated interest keeps students engaged to seek further knowledge and feedback (Lipstein & Renninger, 2007). Optimal learning comes from students' active engagement with the content material being taught (Marzano, 2011, Gardner, 1993, 1983). Studies indicate that students prefer classes that rely less on lecture and more on participatory engagement

through class activities and related experiences because continual listening to lectures is not enjoyable (Boslow, Phelan, & Capoloslo, 2006; & Levy & Peters, 2010).

Differing modalities can enhance writing instruction by actively engaging the student (Kabuto, 2009; Jewitt, 2007; Johannessen, 2004; Longo, 2001; & Farrar, 1991) and enhancing meaning-making, allowing for the interpretation of read information (Kress, 2003). For example, Martin's (2008) work with an author's gallery, a concept drawn from social construction and multi-modal discourse theory, emphasizes the implication of visual modality when writing and editing original compositions. The students' writing gallery featured students' writing with the integration of computer technology in order to utilize a different mode — graphics and color (Martin, 2008). Students' communication through computer technology created challenging learning experiences with visual graphics and colors prompting student interaction with the written text.

Viewing material from a differing modality may trigger a differing perspective on the given textual information. Viewing writing from another dimension may help students to see better the textual information (Kabuto, 2009 & First, MacMillan, & Levy, 1995). Difference in writing modes and styles can potentially be seen (Viau, 1998 a) because luminance changes in text, varying by color choice, can have powerful effects on attention to detail (Lambert Roser, Wells, & Heffer, 2006). Apparent visual changes can potentially enhance the possibility of showing various delineated structures within the written text, revealing logical organization of information. Visual representations of these structures can potentially help with recognition of how related topics connect, stimulating thinking.

Imagery Promotes Thinking Processes: "Imagery has long been recognized as one of the ways humans think" (Black, 1993, p. 1), thus playing an important role in the thinking process. The current literature reflects a steady body of investigative research stemming from a resurgent interest in imagery when regarding the thinking process. For instance, Gibson's perceptual systems' research in 1966 attempted to link the role of imagery in thought process to the senses as perceptual systems (Black, 1993). Gibson believed imagery to be a powerful tool in learning and thinking processes because imagery is a form of sensory perception (Black, 1993). Following Gibson's imagery research, Elliot Eisner, for example, focused much research on aesthetics in relation to language development and cognition (Black, 1993). He supported the notion that aesthetics played a major role in communication of information and concepts because he believed that meaning and significance of information was relayed through perceived patterns and the drawing of relationships between ideas. Eisner (1966) supported the idea that "…cognitive and visual perception need not be in conflict – they complement each other, reinforcing and enriching learning through both channels" (as cited in Black, 1993, p. 1-2). Similarly, Paivio (1971) supports the notion of "…a relationship between imagery and verbal processes" (as cited in Black, 1993, p. 1; & Paivio, 1971). Mental images are "…recalled more powerfully and more rapidly than words" (Black, 1993, p. 2). In fact, Haber's (1970) research purports that "recalling visual images was virtually unlimited and suggested that linguistic recall might greatly improve if techniques could be found to attach words to visual images" (as cited in Black, 1993, p. 2; & Haber, 1970). Following the idea of promoting linguistic recall through visual images, Kosslyn researched human memory theories supporting the idea that images serve as processors and repositories of

information (1980; & Black, 1993). He emphasized that like verbal language, imagery was a major mode of information processing (Kosslyn, 1980; Black, 1993; & Paivio, 1971). Purves (1985) focused on ideas promoting imagery and emotions evoked by the textual language, delineated by patterns within the written text (as cited in Black, 1993).

Although these researchers and their studies have focused on visual imagery as opposed to mental imagery, they hold a commonality— written words in conjunction with a visual aspect will make the textual information more accessible regarding the thinking process (Black, 1993 & Paivio, 1983, 1971). Adding color to the written text attaches a visual medium to words. Color connotations are visual communication stimuli, helping students perceive and consume more information. Generally, students and teachers explore visual information for meaning (Gorman & Eastman, 2010). Color helps to evoke images which can prompt students to more freely associate information to their imaginations (Gorman & Eastman, 2010) and help students' association of concrete qualities to previous knowledge, making connections and creating new understandings. Once an association is made between a new concept and a previously learned concept (referred to as background knowledge) the learner can retain the newly learned content in three dimensional images as opposed to linear textual facts (Freed, Kloth, & Billett, 2006).

According to research, tests of the effectiveness of visual thinking have been conducted to test knowledge representation strategies that organize information and conceptual processing and networking of concept information (Paxman, 2011; Longo, 2001; & Schraeder, 1997 a b). Visual thinking networking has been referred to as "…a new generation of knowledge representation strategies" (Longo, 2001, p. 2). Thinking

visually utilizing color helps promote "…long-term meaningful learning and problem solving achievement" (Longo, 2001, p. 3). Artistic qualities "invites learners to look carefully and deliberately" (Eisner, 2002; as cited in Leigh, 2010, p. 255), so adding color as a symbolic representation to textual information promotes learners to explore the information in multiple ways, without the limiting parameters of black-and-white text. Color implementation enhance student learning and processing by creating a visual learning plane, giving a map, a routine for students to follow.

Colors can be given a tangible associative assignment to enhance processing of information. Brockmann (1991) advises that color is a useful for function when used schematically (as cited in Keyes, 1993). Together, color and a designated coding system can work as a functional perspective to help narrow focus and visually reveal specific characteristics. Keyes (1993) in conjunction with Brockmann (1991) reports that color information helps readers visually focus and access information in order to process it independently of surrounding text. The effectiveness of color enhanced information depends upon "where the color is used", "what elements are cued", "how color cues are differentiated", and "what color characteristics are used" (Keyes, 1993, p. 646).

Color can strengthen the thinking process by making the information visual, creating focal points or information targets that focus the learner's attention to classify different categorized segments within the content material. This perceptual grouping creates information modules (Keyes, 1993) which visually divide the information, forming separate yet pertinent information zones and diminishes any potential distractions of too much textual information within the field of vision. This ability to perceive information independently of the surrounding text and within particular

groupings is dependent upon pre-setting a color scheme designation. Color simplifies by organizing and classifying information for both differences and relationships. Colored targets grouped together can be interpreted as being similar despite their position within the informational text (Keyes, 1993) and assigned a particular color from the color scheme, or they can be interpreted as being different based upon their assigned color thus alerting to the significance of the particular content.

Patterns Enhance Content Acquisition: Patterned arrangements can be found when students interact with the textual content information, by arranging and chunking it into various orchestrated and organized informational divisions and subdivisions. Clustering information into sections isolates familiar concepts together (Tarasovic, 2011; Marzano, 2005; & Longo, 2001; Gardner, 1997; & First, MacMillan, & Levy, 1995). Arranged patterns can be found within the content material through the use of different instructional modalities, facilitating academic achievement. Emerging patterns add spatial cues of information, symbolic indicators of relationships (Lambert, et al., 2006). That is, patterning adds a dimensional clarity to information through chunking and classification of material, and adding color ensures the ability to visually decipher and organize existing patterns.

Learning by association occurs due to symbolic relationships, as found by many research studies investigating color-coded functions (Tarasovic, 2011; Hendricks, Trueblood, & Pasnak, 2006; Marzano, 2005, 2001; Longo, 2001; Kajs et al., 1998; & First, MacMillan, & Levy, 1995). For example, color-codes were used on the computer keyboard and found to lessen children's anxiety when learning about the various

computer keyboard functions (Kajs et al., 1998). Students were able to associate a particular color to a keyboard function and purpose because familiarity with the color facilitated understanding the presented information. In another study, Hendricks, Trueblood, and Pasnak (2006) researched, first grade students' comprehension of patterning rules. Hendricks, Trueblood, and Pasnak (2006) found that through the use of a color-coding approach the students learning the color-coded material significantly outperformed those students who did not receive the color-coding instructional implementation. In this study, the color-coding reinforced the learning of pattern rules as an important thinking ability which enhanced student thinking. Symbolic relationships help learners transfer knowledge from familiar concepts they currently understand to difficult concepts they are attempting to learn (Hendricks, Trueblood, & Pasnak, 2006 & Kajs et al., 1998).

A colored dimension to information allows students to see how ideas fit together, like a graphic organizer. It enhances students' ability to manipulate the informational text more easily. It is important that students be allowed to manipulate information and deduce guidelines and rules from the emerged patterns and themes as they become apparent with the color-coding for generalization purpose. Color-coding can also add a second dimension to informational writing in order to compare and contrast different types of messages in the text (Viau, 1998 a, b). It can also help to separate factual information from emotion in written text (Viau, 1998 a, b), aiding in eliminating potential reader confusion when confronted with a large amount of textual information.

Visualization Supports Critical Thinking: Eisner (2002) "argued that symbolic representation promotes intellectual development and helps learners express meaning rather than merely state it" (as cited in Leigh, 2010, p. 255). Focus and analysis on visually presented information helps the assimilation process and learning, enhancing reasoning and interpretation of information. Hence, students are able to form new ideas, enhancing overall comprehension. Also, color-coding serves to increase students' perceptions (Biggerstaff, Halloran, & Serrano, 1994) of existing information through the use of color metaphors and/or analogies aiding in figuring out informational text and constructing new ideas (Gorman & Eastman, 2010 & Leigh, 2010). The individual colors can be representative; whether a visual image or textual image, color becomes a metaphor (Gorman & Eastman, 2010). Metaphors and analogies ground content by incorporating connections (Marzano, 2005). For example, predicates (otherwise known as verbs) are defined as the action of the subject in the sentence (e.g. grows), so, verbs can be compared to the grass in a backyard because it is in a constant state of action— growth action (e.g. the grass grows). Also, adverbs are defined as the descriptive factor of verbs (e.g. steadily), so adverbs can be compared to water since water is needed to help the grass grow (e.g. growing steadily).

Formed connections help draw students' attention to further analyze and classify the given information. Distinguishing color designations and demarcations helps to capture a student's attention and involve him or her in the learning process (Sofia, 2010) because color-coding allows students to select one color over another in reflective decision making. Differentiated information, through the use of a specifically assigned color-coding, promote student interaction and manipulation of the information through

color associations, enhancing students' inferences regarding basic information relationships and complex content structures (Paxman, 2011, Longo, 2001, & Viau, 1998 a, b). Comprehension skills begin with the understanding that various manners exist in which word arrangement can be manipulated. Depending upon the arrangement of words, phrases, sentences, or paragraphs; the informational meanings can vary. When constructing knowledge, students can link understanding and recall of knowledge (Paxman, 2011). Potentially, various markings can activate prior knowledge or act as a diagramming of idea content flow, engaging readers in constructing further meaning. Hence, students more readily see emerging relationships within the text (Viau, 1998 a) because information presented in traditional format of black and white does not help students differentiate the information.

People bring much of themselves in what they see (Viau, 1998 a); they construct knowledge and develop reasoning from specifics. For example, many readers will use highlighting text as a reflective study method, isolating pertinent information because it induces observant and discerning thought necessary to comprehension (Schraeder, 1997 b). For most beneficial results, highlighting must follow a designated color-coding schema and must be consistent (Viau, 1998 a, b). But it is up to the reader to decide which text is highlighted. Reflective thinking, deciding to color or not or deciding which color per the defining schema to use regarding the textual information, promotes students' social construction of textual meaning. Reflection promotes building and extending already preconceived knowledge (Leigh, 2010).

Color-coding text signals critical content by creating visual planes (Longo, 2001 & Keyes, 1993) and adds dimension to textual content, easing the manipulation of

information in order to see potential patterns emerge (noticing one designated color over another in particular sets). Color-coded text helps to effectively synthesize information (Paxman, 2011) due to the possibility of being able to see emerged patterns and parallels between the textual information. Black (1983) reports that the function of aesthetics is to modify standard forms; combinations and patterns will modify current ideas and perceptions. Students' altered perceptions of existing information can be transformed into newly developed and differentiated information. Color encourages students to have a relationship with informational text in order to reflect, rethink, and revisit the content material (Leigh, 2010). Through the process of an organized color-coding, a visually aesthetic learning strategy, students will have opportunities to cultivate their own sensibilities and awareness of the written content material; hence, students can develop further their critical thinking skills.

Color-Coding Enhancement Impact on Writing Mechanics

Color-coding has been used within English Language Arts classes as an effective teaching tool. Color-coding was used to designate the basic particular parts of a literary work or the compositional divisions and subdivisions of paragraphs and/or sentences. For example, teaching students English literature, Marlys Styne (1986) used color to delineate the various interrelationships of characters within Shakespeare's plays and to learn various literary terms as they are used with poetry. A second example is Farrar's (1991), use of a color schematic in her English classes in order to help her students in their focus of differentiating the various purposes of different words in a sentence and to

identify various writing structures. In both instances, adding color gave students the ability to set conditions and restrictions to the abstract nature of the written text.

Since the production of sentences is the recreation of visualized scenes (Bower, 1972; as cited in Black, 1993), composition construction can be taught utilizing visual images (Tarasovic, 2011). Tarasovic (2011) purports that variety is essential in good writing, so the ability to visualize writing structures can better help to organize and structure the written information. Color can be added to enhance the grammar structures, providing concrete experiences regarding sentence construction, and it can be tied to the natural world to create mental relationships of grammar principles and existing knowledge (Black, 1993). Color-coding can be used as scaffolding technique because it can be used, foundationally, with parts of a sentence and continue through the construction of sentences, paragraphs, essays, and documented research. For example, sentence construction can be delineated and explained through the formed patterns and potentially manipulated interactions of various phrases, clauses, and sentences. Adding a color-coding schema to the writing process promotes informational familiarity and recall, through graphic organization of the text, enables students' visual perceptions, and enhances inquiry-based thinking.

Adding Color: Current research, although scarce, shows that adding color is helpful in more readily recognizing particularities within textual information. Adding color to instructional text will make the informational text visible (Schraeder, 1997 a, b). Coloring written text differentiates the given information by showing the text in isolated segments whereas undifferentiated text presents no isolated elements to aid

interpretations of the written content (Keyes, 1993). By using a color-coding schema, informational text is learned analytically, tracking particular characteristics, details, and structures (Schraeder, 1997 b). Information levels and types complemented with color add an interactive element, signaling the structure and organization of the given information. Color enhances the informational levels by defining the sequential content structure, and color augments the informational types by differentiating categories of information. Accordingly, a well designed color scheme incorporates meaningful visual signals (hints for informational reasoning and recall) to make useful distinctions when mentally following the structure of the information. These created visual landmarks help readers to follow and understand the structure of given information (Longo, 2001 & Keyes, 1993) because visual information structure, according to Keyes (1993), is a "revealing [of] its underlying organization" (p. 639).

"Research studies have demonstrated [that]… color-coding [assists] students in making necessary associations for independent learning" (Chapman, 1993; Pohl & Groome, 1994; & Sherman, 1992 as cited in Kajs, et al., 1998, p. 109). Dwyer and Moore (1992) found color-coding to help learners process newly acquired information (as cited in Kajs et al., 1998). In 1979, Richard Lamberski and Dennis Roberts conducted a research study to determine potential correlations between instructional information presented in black and white text and color formats (as cited in Schraeder, 1997 a). This investigative study, consisting of 176 college students, indicated that color-coding instructional materials was an efficient instructional strategy. Later in 1992, a similar investigative study was conducted by Francis Dwyer and David Moore, researching the effectiveness of color-coding on field dependent and independent learners (as cited in

Schraeder, 1997 a). University students, 117, were comparison tested investigating their information retention when using black and white documents versus documents using seven different colors (ac cited in Schraeder, 1997 a). Color-coding was found to be an effective instructional variable for field dependent learners when assessed visually (as cited in Schraeder, 1997 a).

Also in 1992, Peggy Pruisner investigated color-coding instructional materials' impact on learning (as cited in Schraeder, 1997 a). Pruisner's investigation of color-coded instructional materials and/or assessments versus black and white text on instructional materials and/or assessments reported findings from 563 junior high student participants (as cited in Schraeder, 1997 a). These three investigative studies supported the idea that color-coding instructional materials is effective in assisting students' long-term memory processing and recall. By color-coding textual information, teachers and students created a visual key, enabling students to see pertinent information pulled from the text. In effect, the color-coded presented information became isolated, promoting further comprehension.

Zeki, (1999) reported that neuroscientists had found that reading words in black and white text do not stimulate the regions of the brain that process color, form, motion, orientation and position; so, associations to the read text cannot be formed, hindering potential new learning (as cited in Kirschenbaum, 2006). Whereas awakening these regions of the brain with multi-sensory learning through the use of color associations to emotions derived from real world stimulus can improve students' responses to learning (Zeki, 1999, as cited in Kirschenbaum, 2006).

Using a color-coding schematic not only makes the textual information more visibly segregated but also enhances interest by playing a significant role in the influence and effective communication of textual material (Keyes, 1993). A color-coding schema, as a mode of academic information preparation, adds a fun and creative manner in which to engage students with content material, to brainstorm and outline ideas (Paxman, 2011 & Viau, 1998 a, b). Using color will help students remain focused by simplifying the complexity of information structure and narrowing their attention to the revealed organization and patterns (Schraeder, 1997 b). Because color-coding will help students transition from one idea to another, avoiding unnecessary topics, ideas, or incoherent thought processes (Schraeder, 1997 b); the designated colors within the color schema must be kept consistent (Viau, 1998 a, b), reducing potential color confusion or misunderstandings of association interpretations.

Color-Coding Depicts Familiarity and Enhances Recall: The use of color facilitates recognition because it promotes and enhances student interactive awareness in perceiving the textual world (Leigh, 2010 & Kajs et al., 1998). Since adding color offers familiarity, reviewing instructional text, using a color-coding schema, gives abstract ideas within the informational text visibility and tangibility (Schraeder, 1997 a, b). Students today, process and organize information by sight and context rather than by linear sequencing and defining of terms (Gorman & Eastman, 2010). Analyzing information to generate new concepts begins with simple descriptions associated with emotional response to the information (Gorman & Eastman, 2010). It is human nature to react to any given information through societal conditioning of emotional responses. Emotional responses,

prompted by the use of color, help students recognize information through the colors' attributes and associations to our external world (Gorman & Eastman, 2010; Longo, 2001; & Viau, 1998 a, b). People are accustomed to encountering color-code systems within the external world. For example, traffic lights consist of three colors, and people around the world recognize that red means "*stop*" and green means "*go*". Accordingly, the use of those particular colors, for instance, to designate a particular meaning promotes an associative familiarity (Viau, 1998 a, b). Thus, color potentially becomes a visual prompt, a reminder.

In fact, the addition of color can facilitate teaching and learning by simplifying instructional content into highlighted main points and distinguishing content with specified colored categories. Using color, students can narrow their focus and absorb the presented information in order to think more clearly as they read the textual information (Viau, 1998 b). Color eases the legibility by making the colored text more apparent; and by extension, color eases the processing of information by creating information targets, delineated with specific colors and simplifying complex textual information into visual segments (Keyes, 1993). In this manner, information is seen as idea segments rather than read as individual words.

Learning information linguistically can be difficult for students with mild-moderate disabilities as large amounts of textual content can be overwhelming, and students may struggle to figure out the intended meaning of the printed text (Viau, 1998 a, b & Schraeder, 1997 a, b). Perceiving and distinguishing implicit information from explicit information is difficult to differentiate (Schraeder, 1997 a, b). Research studies,

although limited, have shown that students have a greater propensity to retain, in long-term memory, the information presented in color (Paxman, 2011 & Schraeder, 1997 a).

For example, Schraeder researched the effect of color and student learning (1997 a, b). First, Schraeder (1997 b) developed a color schema in order to enhance students' content relevancy and organization skills when teaching a five paragraph expository paper. She felt that students could not connect with their topic nor organize the written information due to the plainness of the text (Schraeder, 1997 b). Topic qualities were chosen and assigned a color. It was found that students were better able to keep track of developing characteristics and avoid incoherence by following the color-coding schema (Schraeder, 1997 b). Using the color provided a visual stimulus to the students' writing and organization of ideas within the five paragraph essay (Schraeder, 1997 b). Later, during another study, Schraeder (1997 a) administered pre- and post-tests to 78 students regarding narrative and expository reading passages and detecting implicit versus explicit information. Only the experimental groups (2 of 4 total groups) received the highlight intervention to categorize the read textual information (Schraeder, 1997 b). All students were given the same set of explicit and implicit questions. Coloring textual information organizes, categorizes, and classifies which separates and reduces textual content into more relatable chunks of information. So, particular information, off-set with color, establishes boundaries within written text enabling students to gain confidence and once again more readily see various informational structures of the written text (Doyle, Lovett, Pellicci, 2001 & Viau, 1998 a, b). Thus, color-coded text not only potentially aids the familiarity and remembrance of information but also the recall of specific details that were delineated with the color-coding (Keyes, 1993).

Graphic Organization of Content Material: Imagery, creating nonlinguistic representations of written content, acts as a stimulus to conjure up thoughts and create evaluative inferences. Graphic organizers are the most common way to help students generate nonlinguistic representations (Marzano, 2011, 2005; Marzano, Norford, Paynter, Pickering, & Gaddy, 2001; & Marzano, Pickering, & Pollock, 2001), creating mental images. To graphically and structurally organize information, a research-based teaching strategy, will improve content comprehension (Marzano, 2005, 200; Mowat, 2004; & Marzano, Pickering, & Pollock, 2001). Graphic organization of content material is a method of sectioning the textual content into various categories and possibly using imagery as an enhancement to promote the finding of themes and patterns, helping to provide clarity within the content material (Doyle, Lovett, & Pellicci, 2001; Viau, 1998 a, b; & Schraeder, 1997 a, b). It adds another learning facet than to simply read text; it displays it in categorized and arranged divisions and subdivisions (Styne, 1986). Organized information helps to organize the processing of ideas; it helps draw from large assortments of information (Viau, 1998 a, b).

Colored and graphically laid out information structures communicates complex information by chunking, queuing, and filtering undifferentiated black-and-white text (Bezemer & Kress, 2008; Keyes, 1993; & Horton, 1991). First, adding color visually separates or "chunks" information into organized and manageable units according to particular categorizations, designated by a color code. Chunking through the use of color adds two dimensions to information by separating and consolidating different informational groups. Clusters of information that are color-coded show existing relationships within the content material (Viau, 1998 b & First, MacMillan, & Levy,

1995). Different relational types of information, enhanced with color-coding, can be more readily deduced then manipulated into understandable segments. Second, adding color visually presents significant queues of the particular structure of the presented information, designated by a particularly designated color from a preset color-code. Different levels of color-coded information can be considered a "visual organization [and] perceived unconsciously (preattentively)" (Keyes, 1993, p. 639) as specific sequences. Finally, adding color visually filters information by creating layers of information. Color creates a perceptual layer of differentiated and consolidated visual information (Keyes, 1993) because adding color signals critical types of information. Various types of information can be filtered-out as relevant or less relevant information (Keyes, 1993) through the use of designated colors on specific information versus no color on other information.

Graphically presented content material, through the use of color, manipulatively enhances target information desired for students to learn. Visually organized information supports various information content collaborations, encourages student interactions with instructional material, integrates previous knowledge with current knowledge for processing ease, and helps students recall and deliver informational facts effectively (Paxman, 2011; Marzano, 2005, 2001; Mowat, 2004; & Styne, 1986). Visualizing various sections of the written text can also help students see potential combinations and changes that can be made without changing the meaning but enhance the clarity or aesthetic make-up of the informational text (Tarasovic, 2011). Graphic organizers "help students link existing knowledge organized in schemas to new knowledge, thereby,

increasing their understanding" (Mowat, 2004, p. 9); adding color makes the schemas more visible.

For example, Marlys Styne (1986) graphically portrayed poems by color so that her college English students could more readily distinguish particular genres and styles of poetry. In an attempt to also teach figurative language and its importance in diversifying meaning, Styne (1986) color-coded particular aspects of each poem. Typing the poems on the computer she was able to graphically, by shape and line alignment, represent different types of poems and added color to distinguish specific parts of the individual poems (Styne, 1986). Her students were better able to visualize the figurative language aspects of each individual poem (1986), and by extension, better comprehend figurative language components. Graphically mapping the poems with color by figurative language aspects reinforced informational process.

Mind mapping, a graphic technique for organizing facts and thoughts together, is a valued instructional tool, as described in many communication textbooks, according to Paxman's research (2011). "[Mapping] harnesses the full range of cortical skills…in a single, uniquely powerful manner" (Buzan, 1994, p. 13; as cited in Paxman, 2011, p. 7). The focal idea of effectively mapping various concepts is to use text and graphics simultaneously. Adding color to a graphic mind map of information is a multi-faceted product from which to learn and reflect upon, potentially increasing retention of information (Paxman, 2011). Integrating together words, colors, and images assist the brain in conceptualizing ideas as they relate to other ideas (Paxman, 2011).

Instructional content integration in a concept mapping format effectively improves instruction presentation because it eliminates confusion of finding relationships

and pertinent reasoning of factual information. It allows for students to add reflective thoughts then add color to delineate various information types, levels, and structures and visually formats the facts to visually follow the informational text organization in order to see emerging patterns.

Graphically representing content helps students further develop ideas through a visualization of the textual content (Sofia, 2010). Kress and Van Leeuwen stressed that various learning "modes such as text,… graphics, [and] color… act separately and together in new ways to express meaning" (2001; as cited in Martin, 2008, p. 17). Students' academic performances are improved with the increase of thought processes and problem solving skills stemming from the use of color enhanced graphic organizers that integrate together prior knowledge, new facts, and reflective thoughts (Mowat, 2004). "Understanding and then shaping our students' intentions in these rich environments is critical for them as communicators, creators, and consumers of meaning" (Martin, 2008, p. 17). Therefore, graphically mapped text, utilizing color, assists students in viewing various information types, delineating informational structures, and organizing information which makes it easier for them to make inferences and interpretations (Schraeder, 1997 a, b).

Teaching Visual Writing: All domains of life are associated with social practices; likewise, language and literacy are grounded as social in nature. Because of this, the social element in learning should be strengthened to stimulate learning opportunities and prompted possibilities (Martin, 2008). Written expression is varied and complex (Kabuto, 2009) and is situated in everyday social and cultural practices (Kabuto, 2009; &

Martin, 2008). That is, students associate learned material with previously experienced representations. Dewey (1938) "argued that learners actively construct knowledge by transacting with the environment" (as cited in Leigh, 2010, p 254). For example, the color red on an octagonal shape is associated with the stop sign. Moreover, particular modes of representation through media are organized socially. For example, the color pink is usually used to signify femininity and the color blue signifies masculinity. Children use a variety of modes and make various choices based upon organizational elements and meaningful associations of content material representative of their experiences. Students learn new skills based upon the skills and achievements performed within a community where a particular practice is valued (Rogoff, 1995, 1990; Vygotsky, 1978).

In essence, "…teachers [often] overlook the extent to which students surround themselves with visual stimuli…" (Gorman & Eastman, 2010, p. 92). In fact, most children's acceptance of their visual world is "largely passive" (Gorman & Eastman, 2010, p. 92); as though the visual stimuli within the environment is of a second nature to them. Children do not even realize their associative thinking potential in order to make critical judgments about images taken for granted (Gorman & Eastman, 2010). For example, the color red may signify "stop". Children become accustomed to societal color representations. For instance this same color also signifies love. If children see this color on an octagonal shaped object, they may infer that this is representative of a "stopping" action whereas the same color on a heart shaped object may be, in their opinion, representative of "love". Using visual images from daily life, environmental factors, venues, and previous experiences will help students successfully interpret written texts

(Gorman & Eastman, 2010). "The visual nature of the students' world is already in place and is an enjoyable and comfortable tool that teachers need only tap into their lessons on metaphoric thinking" (Gorman & Eastman, 2010, p. 99). Using visuals as an enhancement to academic lessons will help students react to the information rather than simply receive it, expanding students' thinking because students see information more readily than reading it.

Visual writing helps to segment composition writing into various components. Teaching visual writing must involve a method to display the text. It is not only the words that matter but also the manner in which they are arranged and presented which also affects the meaning of a sentence or paragraph. Composition writing is more than communication of ideas; it is expression of particular ideals. Language components within written text must function together systematically and creatively in order to appropriately communicate the writer's intentions, whether narration, description, explanation, or persuasion. Good instruction in writing offers both "*a rhetoric* and *a grammar*" in order to see the big picture and the specific details within (Bush & Zuidema, 2011).

Teaching writing is like teaching the grammar of design. "Good instruction in design has an important parallel to good teaching about the textual aspects of writing" (Bush & Zuidema, 2011, p. 87). In essence, it is teaching visual grammar. Teaching design means differentiating and distinguishing size, shape, color, style, and position. This can be accomplished by using a teaching approach that includes: 1) contrast, 2) repetition, 3) alignment, and 4) proximity (Bush & Zuidema, 2011 & Greenberg, 2010). First, to portray the contrast of a typed article, for example, with boldfaced segments

emphasizes key ideas and creates eye-catching visual elements (Bush & Zuidema, 2011 & Greenberg, 2010). Second, the repetition of particular contrasted items in a typed article will portray importance to an idea (Bush & Zuidema, 2011 & Greenberg, 2010). Third, the alignment of typed articles into standard formats creates tidiness in the text, mirroring a newspaper or magazine (Bush & Zuidema, 2011 & Greenberg, 2010). Fourth, proximity of particular sections of a typed article will emphasize internal unity to focus attention (Bush & Zuidema, 2011 & Greenberg, 2010). It is important for students to understand how these elements can be controlled to draw readers' attention to particular aspects of writing (Bush & Zuidema, 2011 & Biggerstaff, Halloran, & Serrano, 1994). Also, Bush and Zuidema (2011) reported that this designing methodology serves as a memorable means of retaining and retrieving information given that visual imagery relates to prior knowledge, the thinking process, and recall (Peters & Levin, 1986; Black, 1983; Kosslyn, 1980; Paivio, 1983; & Paivio, 1971).

Teaching visual grammar can be taught in a similar manner to teaching design, because visual grammar portrays composition in n common manner (Bush & Zuidema, 2011). The addition of color is simply a designing technique to writing. To make grammar visual, adding color will *contrast* particular words, phrases, or clauses, *delineating* particular segments within a sentence or paragraph. Color divisions can help students to distinguish the types of sentences (simple, compound, complex, and compound-complex) with the portrayal of the position of words and phrases illuminating particular sentence segments. The *repetition* of particular colors and positions will articulate emerging patterns that can be categorized and classified. The *alignment* of particular colors will mirror patterns in spite of the changing text. Alignment and

placement of particular patterns will highlight distinctive structures within sentences or paragraphs. The *proximity* of various color coordinated segments will focus attention on idea arrangement, enhancing sentence or paragraph organization. Hence, good writing skills should be the product of the circumstances for learning created within the instructional lessons.

It is not sufficient solely to teach rules and conventions of language; educators must also teach the rules and conventions for how language is displayed on a page. Visual grammar, as a rhetorical skill, adds dimension to textual elements in writing, (Bush & Zuidema, 2011; & Biggerstaff, Halloran, & Serrano, 1994), adding a spatial and interactive effect. Being able to see and use language effectively and persuasively will help students more readily respond to writing demands.

"The process of visual linking can facilitate the student to text connection" (Gorman & Eastman, 2010, p. 92). Students can more readily explore specific associations, patterns, and methods of subject content when visual to text links have been made. Interpreting written text in a visual manner, students, with guidance from teachers, can begin to notice patterned associations in the content information and thus draw parallels within the text (Gorman & Eastman, 2010). These parallels can then be tied to particular instructional facts. For example, finding patterned associations within English composition lessons can be tied to particular grammar rules. For instance, students, noticing that compound sentences are made up of two simple sentences with a coordinating conjunction tying them together, can draw a parallel to a grammar rule stating, "*A compound sentence is created with 2 independent clauses and a coordinating conjunction.*" In fact, categorization of information can also be made in order to draw

further parallels, enabling students to better reason with facts and more comprehensively explain given information. For example, students can categorize given sentences into independent clauses and dependent clauses thus noticing that dependent clauses always begin with a subordinating conjunction.

Grammar lessons should be taught not as a lecturing of information but rather as a teacher reinforcing the validity of word usage and arrangement (Urowitz & Bozzato, 1992) and reinforcing the communicative positioning of words and groups of words. Teaching visual grammar, by means of displaying the information, helps students see different choices (Bush & Zuidema, 2011). For example, students can, after chunking and categorizing various clauses as either independent or dependent, select and manipulate the clauses' positions to create either a simple sentence (using only 1 independent clause), compound sentence (using 2 independent clauses with a coordinating conjunction), or complex sentence (using 1 independent clause and 1 dependent clause). Moreover, students can, using further critical thinking skills, manipulate spatially the clauses to realize that an independent clause can be converted to a dependent clause by adding a subordinating conjunction at the beginning (or vice versa…remove a subordinating conjunction from the dependent clause to create an independent clause). In fact, being able to see different choices enhances information manipulation. Students need to be able to distinguish information as various sets of choices in order to visualize various manners in which to manipulate and organize the information. Writing assignments, for example, can be structured so that students can make choices regarding idea structure and organization (Bush & Zuidema, 2011). Micromanaging students with decisions and rules will deprive students of the opportunity

to discover choices (Bush & Zuidema, 2011) and by extension learn new ideas through reflection and problem solving. Activating student choices facilitates reflective thinking.

The writing process has typically been instructed in a very concrete or linear manner with *right* and/or *wrong* answers. Students need to see the process of writing and not the individual aspects resulting in writing when appropriately brought together. In fact, current research on best practices, regarding instruction, reflects that focusing on student holistic interactions with writing will result in more effective written output rather than focusing on segregated isolated skills (Marzano, 2011, 2005, 2001; & First et al., 1995). Writing, taught as a process, enhances students' meta-cognitive skills (First, MacMillan, & Levy, 1995); it also facilitates the realization and associated behaviors that accompany writing abilities to write, review, and revise. Moreover, writing should be enjoyable for students in order for them to develop writing skills and have healthy attitudes toward writing.

Adding color as an enhancement adds a manner in which students can take in, interact with, reflect upon, and generate further content material (Horton, 1991). Intrapersonal interactions with written content material can "…lead to revision of output and improvement in learners' written performance" (Cotos, 2011, p. 420). Color and color schematics allow students to see the writing components and structures being revised and edited and to manipulate selected text segments as depicted by a particular color. Teachers adding a color enhancement to instructional materials offer students an opportunity to visualize the content and follow the teacher's thought processes and manipulation of the content.

Writing skills are more readily improved upon if modeled, guided, and/or reflected upon (Bush & Zuidema, 2011). First, students more readily learn new material when it is visually modeled, depicting both good and bad examples (Bush & Zuidema, 2011). Without yet knowing the full material, students can analyze traits inductively, reaching conclusions based upon observations of the color-coded segments. Through the manipulation of various structural segments delineated by the color-coded enhancement, students can deductively create reasonable and logical rules and principles. This "…becomes an entryway… [to] …learning about the rhetorical nature of all writing (Bush & Zuidema, 2011, p.89). Secondly, guided practice allows students to access and use already existing knowledge in order to create more appropriately new versions of existing knowledge, "…mak[ing] rhetorical decisions" about the color-coding affect on various writing components (Bush & Zuidema, 2011, p. 89). Finally, reflection of how students' color-coded pieces "reflect their rhetorical understanding" (Bush & Zuidema, 2011, p 89) becomes easier as the color makes the grammar components visible and meaningful. Students can think seriously to credit or discredit a grammar principle based upon earlier judgments. This self-reflective process is based upon the nature of the visibility of grammar components, creating meaningful ownership of the content material. Ownership in evaluation of content material will generate student and teacher enthusiasm regarding authentic assessment of learned material due to the visual manipulation of content (Biggerstaff, Halloran, & Serrano, 1994).

This literature review addresses how color-coding for classroom materials' organization and instructional content organization has been attempted by various educators. However, the current literature does not report a unified color-coded

schematic nor does it account for a rationalization or reasoning for the chosen colors used. The research supports that teachers should organize literacy programs and classroom teaching-learning interactions within a self-regulated manner guiding students rather than directing students' learning (Perry & Drummond, 2002). Fostering self-regulated learning offers students "opportunities to engage in complex, meaningful tasks… control the level of challenge tasks present, evaluate their work, and collaborate with peers" (Perry & Drummond, 2002, p. 298). Following a designated color-coding system potentially helps students interact with the content material and within a self-regulated manner. Since color-coding promotes visibility of textual structures and organization, chances to manipulate the content offer students' opportunities to control the text and evaluate manipulation decisions. By extension, visualizing the written text will help students who struggle with the writing process to plan, generate, organize, structure, and revise written material, creating a well-written piece of text.

CHAPTER III

METHODOLOGY

This mixed methods study (primarily quantitative) focused on determining the effect of a color-embedded writing strategy using a color-coding system on the written expression skills of adolescent students with mild-moderate disabilities. An experimental design was used to compare the effects of the color-coding as an enhancement to a writing strategy implemented with sophomore and junior students. Comparison groups were taught using the same curriculum material with the color-coding system embedded within a writing strategy as a visual support and without the color-coding as a visual support.

Methods

The high school English department is coordinated across grades 9-12 by teaching the content with the same curriculum materials and assessing students with the same tests. Thus a student taking English 1 from teacher A will experience the same content and assessments as a student taking English 1 from teacher B. This design focuses on the assessments of students' knowledge is being assessed rather than a teacher's instructional

or test materials. Teachers work closely together to coordinate the curriculum across the class sections through the sharing of instructional materials and engaging in interpersonal discussions and support. The high school English teachers created the current English curriculum, in alignment with state curriculum protocols (which incorporate both Pass Skill and Common Core standards) as well as district mandates (which incorporate community standards and benchmarks for university, college, technology center, and/or workforce application and admittance). The common English curriculum were collaboratively developed by all the general education English teachers and modified each year with their respective input.

Because students with mild-moderate disabilities must meet the same curriculum and assessment requirements as their non-disabled peers, the special education English program follows the general education English program by using the same curriculum and materials for instruction, modeling and practice, reinforcement, and content assessments. Instruction is differentiated in the special education classroom to address the individual learning needs of the students. Differentiating the content materials requires more instructional time, so the special education English program covers approximately 75% to 80% of the curriculum guide. The remaining 20% to 25% of the content material is left out, at the discretion of the collaborative input of the special education department (including the literature, reading, math, science, history, vocational/life skills, and study skills teachers).

Tenth and eleventh grade students, with mild-moderate disabilities who were assigned to the special education English classes were selected for this study. The five English classes, three 10^{th} grade level classes and two 11^{th} grade classes were assigned to

grade level control and experimental groups. One sophomore (n=10) and one junior (n=11) English class comprised the control group, the group that received no color-coding embedded into the writing strategy. Two sophomore (n=20) English classes and one junior (n=9) English class comprised the experimental group that received the writing strategy with the color-coding embedded within the strategy. The individual groups were created by randomly assigning an ID letter and number (e.g. sophomore A, B, and C and Junior 1 and 2) and having the school principal identify each class as either a control or experimental class. Students were not told which group they were assigned.

Students in the control group classes were provided daily structured English composition lessons using a standard didactic teaching methodology focusing on a writing strategy while students in the experimental group classes were provided the same daily structured English composition lessons, still in a didactic manner but with a color-code embedded within the writing strategy. In order to prevent students from the two different groupings comparing class work outside the classroom, neither textbooks were issued to students nor homework lessons assigned; all instructional materials were used inside the classroom and kept in student file folders that remained in the classroom. Verbal presentations and example explanations differed only in the addition of the color-coding to the same directives and examples given to students in the experimental group. This was accomplished by maintaining a very structured lesson plan book, available to the teacher/researcher only. In both the control and experimental groups, the students were given various assessments during their respective English class periods to measure progress. The specific details of the class instruction are explained in Appendix F.

A pre- and post- standardized measure of writing ability was administered to all students who participated in the research study. The Test of Written Language – 4th Edition (TOWL– 4), was given to all students at the beginning and end of the 2012-2013 school year in order to determine changes in writing skills. A qualitative measure was used to obtain students' perceptions of their writing skills and potential to improve. Students in the experimental groups only received the qualitative measure, a participant survey. Student surveys were passed out at the end of this investigative study. Students were given an opportunity to complete the survey either during English class or at a later time to be turned in by the end of the following day. Surveys remained anonymous as students were instructed not to put their names on the surveys, and they were turned into a submission box that does not allow retrieval once a paper has been submitted. The box was kept in the high school's main office to allow student anonymity as participant surveys were submitted. Only the teacher/researcher read the surveys.

Participants

Sophomore and junior grade students with mild-moderate disabilities who were assigned to the special education English classes were the participants of this study. Of the thirty-two sophomore students and twenty-six junior students eligible to participate in the research study, thirty-two sophomore students and twenty-five junior students agreed to take part in the study. However, during the course of the school year, seven student participants dropped out of the study. The seven students who dropped out of the study consisted of: one sophomore male student who changed his class schedule, one sophomore male student who left the school district, one junior female student who left

the school district, two junior male students who transferred from in-class sessions to online courses, one junior male student who changed schools within the district, and one junior male student who dropped out of school. Thus, this research study consisted of thirty sophomore and twenty junior student participants: thirty-four male students and sixteen female students.

Sophomore and junior English classes were chosen because these classes of students yielded the most diverse population of students with mild-moderate disabilities. All of the students participating in the study had Individual Education Plans (IEPs) with English goals. Mild-moderate disabilities represented in this study were Autism Spectrum Disorder (ASD), Emotional Disturbance (ED; also referred to as Emotional/Behavioral Disturbance, EBD), Intellectual Disability (ID; formerly known as Mental Retardation, MR), Other Health Impairment (OHI), Orthopedic Impairment (OI), Specific Learning Disability (SLD; also referred to as Learning Disability, LD), and Traumatic Brain Injury (TBI).

Both female and male students participated in the study. Students participating in the control group consisted of three female students and eighteen male students. Students participating in the experimental group consisted of thirteen female students and sixteen male students. Ethnicity/race represented in this study were as follows: African American, Caucasian, Caucasian/Hispanic, Caucasian/Native American, Hispanic, Hispanic/Native American, and Native American.

Of the students participating in this study, five students were classified under multiple service requirements, as stipulated on their IEPs. Listed on the IEP as a secondary disability, one student was also receiving supportive services from a speech

pathologist for a Speech-Language Impairment. Listed on the IEP as a secondary education service, four students were also receiving English Language Learner (ELL) services from the district interpreter and ELL teacher for an evaluated and diagnosed linguistic barrier. Individual sophomore student participant demographics for group category (control or experimental), race/ethnicity, gender, disability category, and other applicable educational services are represented in Table 1 for sophomore students in the control group and Table 2 for sophomore students in the experimental group. Likewise, individual junior student participant demographics for group category (control or experimental), race/ethnicity, gender, disability category, and other applicable educational services are represented in Table 3 for junior students in the control group and Table 4 for junior students in the experimental group.

Table 1
Sophomore Control Group Student Demographics

Sophomore Control Group Participants												
	Participants	**Gender**		**Disability Category**							**Other Service**	
	Race /Ethnicity	**F**	**M**	**ASD**	**ED**	**ID**	**OHI**	**OI**	**SLD**	**TBI**	**ELL**	**Speech**
CONTROL GROUP	***African American***											
	Caucasian	1							1			
			3		1	1			1			
	Caucasian / Native American											
			1							1		
	Caucasian / Hispanic	1							1			
			1					1				
	Hispanic											
			2				2				2	
	Hispanic / Native American											
			1						1			
	Native American											
Total Students = 10		2	8		1	1	2	1	4	1	2	

Table 2
Sophomore Experimental Group Student Demographics

Sophomore Experimental Group Participants												
EXPERIMENTAL GROUP	**Participants**	**Gender**		**Disability Category**							**Other Service**	
	Race /Ethnicity	**F**	**M**	**ASD**	**ED**	**ID**	**OHI**	**OI**	**SLD**	**TBI**	**ELL**	**Speech**
	African American											
			1				1					
	Caucasian	7							7			
			6			1			5			
	Caucasian / Native American	1							1			
			1	1								1
	Caucasian / Hispanic											
			1						1			
	Hispanic	1					1				1	
	Hispanic / Native American											
	Native American	1								1		
			1				1					
Total Students = 20		10	10	1		1	3		15	1	1	1

Table 3
Junior Control Group Student Demographics

Junior Control Group Participants												
	Participants	**Gender**		**Disability Category**							**Other Service**	
	Race /Ethnicity	**F**	**M**	**ASD**	**ED**	**ID**	**OHI**	**OI**	**SLD**	**TBI**	**ELL**	**Speech**
CONTROL GROUP	***African American***											
			3				1		2			
	Caucasian	1					1					
			6				2		4			
	Caucasian / Native American											
			1						1			
	Caucasian / Hispanic											
	Hispanic											
	Hispanic / Native American											
	Native American											
Total Students = 11		1	10				4		7			

Table 4
Junior Experimental Group Student Demographics

Junior Experimental Group Participants												
EXPERIMENTAL GROUP	**Participants**	**Gender**		**Disability Category**							**Other Service**	
	Race /Ethnicity	**F**	**M**	**ASD**	**ED**	**ID**	**OHI**	**OI**	**SLD**	**TBI**	**ELL**	**Speech**
	African American											
			1				1					
	Caucasian	2							2			
			3				1		2			
	Caucasian / Native American	1							1			
			1				1					
	Caucasian / Hispanic											
	Hispanic											
			1						1		1	
	Hispanic / Native American											
	Native American											
Total Students = 9		3	6				3		6		1	

The sophomore and junior cohorts were very different in terms of the disability groups represented. The disability category of Autism Spectrum Disorder (ASD) was not represented in the sophomore control group and the categories of Emotional Disturbance (ED) and Orthopedic Impairment (OI) were not represented in the sophomore experimental group. The junior groups were much less diverse with only the disability categories of Specific Learning Disability (SLD) and Other Heath Impairment (OHI) represented in the control and experimental groups.

Personal conferences to explain the research study were conducted with each administrator and student with respective family member(s) prior to signing any 'Permission/Assent/Consent to Conduct Research' forms. The teacher/researcher has worked with these students in the past as their English teacher and occasionally as their study hall teacher, so the teacher/researcher is familiar to the student participants and their respective families. The teacher/researcher explained the entire permission/assent/consent process as well as the research study purpose and methodology. Parents were offered a photocopy of their signed permission form and their respective child's assent form. All students and families signed the forms with the exception of one student participant who did not want to take part in the study. This student remained in the class and participated in the curriculum but no data was collected.

Data Collection - Quantitative

The data obtained for this study came from pre- and post-assessment sources and qualitative open-ended survey responses resulting in data on fifty student participants. The first input for this study was conducted by the teacher/researcher and it pertained to

the assessing of students' writing skills, before English instruction could begin, with standardized pre-testing. All eligible students (N=57) were given the TOWL-4 assessment. Sophomore students (n= 32) were given Form A and junior students (n=25) were given Form B before any English writing instruction took place in the classroom. The TOWL-4 was administered individually by the teacher/researcher. Pre-testing was completed in the month of August and post-testing was done the following April. As mentioned before, seven students were dropped from the study during the course of the school year. Sophomore students (n=30) were given Form B and junior students (n=20) were given Form A for post-testing.

Student demographic information was also collected to provide a full description of the student participants including race/ethnicity, gender, grade level, and disability. Demographic data were collected via students' IEP paperwork and confirmed with school student records.

A second input was a 'Student Perceptions of Color-Coded Instruction' survey. The survey consisted of fourteen statements for rating and five open-ended questions. All student participants in the experimental group (n=29) were given this survey. A copy of the 'Student Perceptions of Color-Coded Instruction' can be found in Appendix E.

TOWL-4 Assessment

Standardized writing pre- and post-assessments using the Test of Written Language –Fourth Edition (TOWL-4) were conducted to measure changes in students' writing skills. The TOWL-4 is a standardized assessment of written language in children and adolescents (McCrimmon & Climie, 2011). It is an individual or group –based

measure of written language for students aged '*9 years, 0 months'* through '*17 years, 11 months'* and used to identify students' strengths and weakness in writing abilities in order to identify those students in need of written expression instructional support or intervention (McCrimmon & Climie, 2011). The TOWL-4 is not only for documenting students' progress resulting from written language interventions but also to provide a measurement in written language research because it may be administered by psychologists or non-psychologists who have undergone formal training in standardized psychoeducational assessment (McCrimmon & Climie, 2011). The TOWL-4 consists of seven subtests that combine to form an overall writing score based upon two composites: the Contrived Writing and Spontaneous Writing composites (McCrimmon & Climie, 2011). The Contrived Writing tasks focus on discrete aspects of the writing process, such as spelling, punctuation, and word usage. The Spontaneous Writing tasks focus on an individual's functional writing ability (the quality of writing composed). Scaled scores are provided for subtests and composites with scoring parameters for each subtest. See Appendix G for additional information on the TOWL-4.

Data Collection - Qualitative

Qualitative data were collected to measure students' perceptions of writing components and their confidence in writing. A nineteen item survey using both Likert-rated and five open-ended responses were used to collect that data. The surveys were given only to the experimental group participants because the questions focused on students' attitudes about the color-coding enhancement that was embedded into the writing strategy. The survey items asked participants to classify their attitudes regarding

the color-coding enhancement to the writing instruction. See Appendix E for the participant survey.

Likert responses followed a standard format of: *strongly agree*, *agree*, *neutral*, *disagree*, and *strongly disagree*. Open ended questions were asked regarding students' input about the color-coding writing strategy's implementation to inquire as to what aspects of the color-coding enhancement, embedded within the writing strategy, the students preferred.

Data Analysis

Data in the current study were analyzed with a between and within groups ANOVA where students in the control group received classroom instruction and the students in the experimental group received classroom instruction with the color-coding enhancement. The TOWL-4 Overall Writing pre- and post-test scores for the mean, standard deviation, and standard error, using a 95% confidence interval for the mean were calculated for the sum of scaled scores, percentile, and composite index for both pre- and post-tests.

Findings were analyzed deductively, showing positive relationships in students' assessment scores (dependent variable) with respect to the color-coding enhancement (independent variable). This research study focus was on the differences of the two conditions of instruction (addition of color-coding enhancement vs. no addition of color-coding). A randomized and manipulated independent variable will determine the cause and effect conclusion of whether color-coding does or does not affect students' assessment outcomes.

Quantitative findings were analyzed to identify relationships between and among writing strategy elements and student writing performance. Statistical means were derived from: (a) sophomore students enrolled in special education English class receiving the color-coding enhancement in relation to sophomore students enrolled in special education English class not receiving the color-coding enhancement, (b) junior students enrolled in special education English class receiving the color-coding enhancement in relation to junior students enrolled in special education English class not receiving the color-coding enhancement, and (c) the number of students receiving the color-coding enhancement and those not receiving the color-coding enhancement in relation to the writing scores for both pre- and post-assessments.

Qualitative analysis, were conducted to provide a richer description of the data. The collected data were synthesized into significant patterns to construct a realizable framework. This was accomplished through an open coding process in accordance with data collection methods. Afterwards, a more focused coding process was used to identify emerged themes and relationships between collected data. As various associations were categorized, further analysis continued until all relationships of themes and sub-themes in the research data were exhausted.

The mixed methods data analysis portion was comprised of statistical relationships of the performance and reactions of students' receiving the color-coding enhancement, embedded within the writing strategy. Once qualitative data were coded, percentage of responses were calculated per each group in order to discover any relationships between students' grade level and receipt of the color-coding enhancement that was embedded within the writing strategy taught in class.

Validity, Reliability, and Generalizability

To enhance the validity, reliability, and generalizability of the research, the researcher, who was also the teacher of record that delivered the instruction, implemented the writing strategy with the embedded color-code for the experimental groups, and collected the data for all groups and did so within a structured protocol. The teacher/researcher used the same content curriculum for each grade level, and within each grade level, the curriculum content was delivered in the same manner. Valid and reliable assessments were used.

The TOWL-4's reliability was calculated within five types of correlation coefficients: coefficient alpha, alternate form (immediate administration), test-retest, alternate form (delayed administration), and scorer difference. The reliability of the TOWL-4, both form A and form B, were measured by its internal consistency, using the Cronbach's coefficient alpha and through the administration of alternative forms. The coefficient alpha scores yielded for all three composites (Contrived Writing, Spontaneous Writing, and Overall Writing) were good to excellent (McCrimmon & Climie, 2011). See Appendix Table G1 for more information on the Grade-based Coefficient Alphas.

The TOWL-4's validity was calculated through its Criterion-Prediction Validity in which the effectiveness of predicting an individual's performance in specified activities within each test is analyzed. Considered valid, this test measures an important aspect of literacy and does correlate highly with other tests that measure reading and writing. Furthermore, the content-description validity examines the test content to determine whether it covers a representative sample of the domain to be measured (McCrimmon & Climie, 2011). This kind of validity is built into the test at the time that

subtests and items are conceptualized. Four different demonstrations of content-description validity are offered for the TOWL-4 subtests (McCrimmon & Climie, 2011). First, the description of the rationale for each subtest's content and format is analyzed. Second, a discussion of the procedures is used to select the pictures for the Spontaneous Writing subtest. Third, the validity of the TOWL-4 items is empirically demonstrated by the results. Fourth, the results of differential item functioning analyses were used to show the absence of bias in test items.

To ensure the validity of the research design, implementation, and analysis, a research journal of all observations, reflections, and interactions with the data during collection and analysis within the study was maintained. These journal writings originated during the first class of the day and were followed in all other classes throughout the day to ensure that the same instructional information was given to all student participants. Member checking of recorded information was also used to support the accuracy of the collected data.

Reliability was assessed through the use of triangulation collection methods (researcher observations, standardized writing assessments, and surveys) adding rigor and corroborative evidence of the obtained data while eliminating any preconceived biases. Common patterns found in the socio-educational interactions of students receiving the color-coding enhancement, embedded in the writing strategy, in comparison to those students not receiving the color-coding enhancement were documented through: writing assessment scores and survey responses. Generalizability of the findings was reported with observed social actions and assessment scores within the special education English classes supportive of the delineated student awareness of writing components.

Confidentiality

Confidentiality issues were addressed through the use of three protocols: (a) participant informed consent, (b) researcher/participant reciprocity, and (c) participant letter and/or number IDs. All gathered information was held strictly confidential by utilizing letter and number IDs rather than participant names. All information was stored in a locked file cabinet located in the researcher's classroom at the high school; only the researcher had a key. All collected forms, standardized assessment materials, and data collection sheets will be destroyed after a three year period. The school will be identified as simply a high school in the state of Oklahoma, and student participants will be identified by grade level classification and assigned a letter or number (e.g. sophomore student A and/or junior student 1). Data were reported as individual results and as class results, used for comparison purposes only.

Limitations

Because the implementation and analysis rested with the researcher, a potential limitation to this study was the impact on research data objectivity. More subjectivity in personal perceptions may have arisen due to the researcher's special education expertise possibly predisposing her to students' perspectives and learning needs when instructing the class. In order to counter possible biases, a negative, discrepant case analysis position in seeking variations in the understanding of the phenomenon was sought by challenging personal expectations or emerging findings.

Participants' attitudes of acceptance toward the color-embedded writing strategy were another limitation to this study. Participants may not implement the newly taught

color-coding enhancement effectively to affect writing improvement. They may simply choose not to "buy-into" the idea and thus warrant little focus to really process and learn the given information. Students' general motivation to learn is another potential limitation to this study. Many studies have shown that adolescents with disabilities have significant motivational issues.

Students' appropriate application of the color-embedded writing strategy is another limitation to this study. It is possible that students may not have appropriately or consistently applied the color-coding effectively enough to be measured through testing. The teacher/researcher may not have caught students' mistaken interpretations of the color-coding schema while circulating through the room and attempting to work with each student. While the teacher/researcher was modeling the color-coding on the Promethean Board, she may not have noticed students' apathy toward the learning objectives or their disregard to focus on target objectives. In other words, students may have simply been copying verbatim what the teacher/researcher was posting on the board with no real information processing.

Students qualifying and receiving educational services under the ELL category may be another limitation to this study due to the language barrier. Their linguistic barrier may have been a hindrance to their true concept acquisition of the color-coding embedded writing strategy since many terms and concept understandings may not translate verbatim to process the given information effectively.

CHAPTER IV

FINDINGS

A better understanding of the writing process would dramatically improve the performance of adolescents with mild-moderate disabilities who experience school failure due to writing difficulties. This study sought to determine if a systematic implementation of a color-coding embedded writing strategy can aid students to more readily understand the writing components and improve overall writing performance.

A standardized writing assessment was given (pre- and post-tests) to the control and experimental groups with significant statistical findings resulting.

Quantitative Findings

Findings were analyzed deductively, deriving relationships showing positive relationships in students' assessment scores (dependent variable) with respect to the color-coding enhancement (independent variable) within the writing strategy and driven by the research questions.

Research Question 1: Does color-coding improve student written expression skills in the area of conceptual development?

Contrived Writing

The TOWL-4 standardized writing assessment was used to measure conceptual development of study participants. Although these subtests were used to assess specific writing skills, when specific subtests are aggregated, they can also measure conceptual development of a student's writing ability. Subtests 1 - 5 were compiled and used to score students' Contrived Writing skills. The individual sum of scaled scores and the composite index scores for the TOWL-4 Contrived Writing assessment were calculated for pre- and post-tests. The sum of scaled scores, percentile ranks, and composite index scores of Contrived Writing for both pre- and post-tests can be found in the following tables. Table 5 shows the data for Contrived Writing for sophomore participants in the control group, and Table 6 shows the data for Contrived Writing for sophomore participants in the experimental group.

Table 5
Control Group Individual Sophomore Student Contrived Writing Scores

Contrived Writing (subtests 1 - 5)							
CONTROL GROUP	**Sophomore Student**	**Sum of Scaled Scores**		**Percentile**		**Composite Index**	
		Pre-	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post**
	1	26	33	3	8	71	79
	2	16	20	<1	<1	59	64
	3	30	38	5	18	76	86
	4	38	33	16	8	85	79
	5	24	27	1	3	68	72
	6	29	32	4	7	74	78
	7	15	15	<1	<1	58	58
	8	29	28	4	3	74	73
	9	24	37	1	14	68	84
	10	33	35	8	12	79	82
	Mean	26.40	29.80			71.20	75.50

Table 6
Experimental Group Individual Sophomore Student Contrived Writing Scores

Contrived Writing (subtests 1 - 5)							
	Sophomore Student	**Sum of Scaled Scores**		**Percentile**		**Composite Index**	
		Pre-	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post**
EXPERIMENTAL GROUP	**A**	19	31	<1	6	62	77
	B	36	43	13	30	83	92
	C	12	27	<1	3	54	72
	D	37	45	14	35	84	94
	E	31	55	6	65	77	106
	F	39	52	18	58	86	103
	G	15	39	<1	19	58	87
	H	34	53	9	61	80	104
	I	20	37	<1	14	64	84
	J	41	48	23	77	89	111
	K	29	50	4	50	74	100
	L	31	38	6	18	77	86
	M	33	49	8	47	79	99
	N	25	39	2	19	70	87
	O	22	46	1	37	66	95
	P	42	42	25	25	90	90
	Q	28	41	3	23	73	89
	R	27	45	3	35	72	94
	S	22	38	1	18	66	86
	T	21	45	1	35	65	94
	Mean	28.20	43.15			73.45	92.50

The mean scores for Sum of Scaled Scores and Composite Index were calculated for sophomores in the control group for Contrived Writing. The mean for the sum of scaled scores is 26.40 for the pre-test and 29.80 for the post-test with a 3.40 positive difference. The mean for the composite index is 71.20 for the pre-test and 75.50 for the post-test with a 4.30 positive difference. The percentile ranks ranged (low to high) from <1 to 16 for pre-test and <1 to 18 for post-test.

The mean scores for Sum of Scaled Scores and Composite Index were calculated for sophomores in the experimental group for Contrived Writing. The mean for the sum of scaled scores is 28.20 for the pre-test and 43.15 for the post-test with a 14.95 positive difference. The mean for the composite index is 73.45 for the pre-test and 92.50 for the post-test with a 19.05 positive difference. The percentile ranks ranged (low to high) from <1 to 25 for pre-test and 3 to 77 for post-test.

The individual sum of scaled scores and composite index scores for the TOWL-4 Contrived Writing assessments were calculated for pre- and post-tests. The sum of scaled scores, percentile ranks, and composite index of Contrived Writing for both pre- and post-tests can be found in the following tables. Table 7 shows the data for Contrived Writing for junior participants in the control group, and Table 8 shows the data for Contrived Writing for junior participants in the experimental group.

Table 7
Control Group Individual Junior Student Contrived Writing Scores

Contrived Writing (subtests 1 - 5)							
	Junior Student	**Sum of Scaled Scores**		**Percentile**		**Composite Index**	
		Pre-	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post-**
CONTROL GROUP	**1**	15	36	<1	13	58	83
	2	44	26	32	3	93	71
	3	26	40	3	21	71	88
	4	51	46	55	37	102	95
	5	25	29	2	4	70	74
	6	40	40	21	21	88	88
	7	46	47	37	39	95	96
	8	38	20	18	<1	86	64
	9	37	41	14	23	84	89
	10	18	27	<1	3	61	72
	11	33	40	8	21	79	88
	Mean	33.91	35.63			80.63	82.54

Table 8
Experimental Group Individual Junior Student Contrived Writing Scores

Contrived Writing (subtests 1 - 5)							
EXPERIMENTAL	Junior Student	Sum of Scaled Scores		Percentile		Composite Index	
		Pre-	Post-	Pre-	Post-	Pre-	Post-
	A	43	48	30	42	92	97
	B	20	47	<1	39	64	96
	C	36	41	13	23	83	89
	D	36	44	13	32	83	93
	E	53	62	61	84	104	115
	F	54	61	65	82	106	114
	G	32	23	7	1	78	67
	H	36	49	13	47	83	99
	I	35	48	12	42	82	97
	Mean	38.33	47.00			86.11	96.33

The mean scores for Sum of Scaled Scores and Composite Index were calculated for juniors in the control group for Contrived Writing. The mean for the sum of scaled scores is 33.91 for the pre-test and 35.63 for the post-test with a 1.72 positive difference. The mean for the composite index is 80.63 for the pre-test and 82.54 for the post-test with a 1.91 positive difference. The percentile ranks ranged (low to high) from <1 to 55 for pre-test and <1 to 39 for post-test.

The mean scores for Sum of Scaled Scores and Composite Index were calculated for juniors in the experimental group for Contrived Writing. The mean for the sum of scaled scores is 38.33 for the pre-test and 47.00 for the post-test with an 8.67 positive difference. The mean for the composite index is 86.11 for the pre-test and 96.33 for the post-test with a 10.22 positive difference. The percentile ranks ranged (low to high) from <1 to 65 for pre-test and 1 to 84 for post-test.

Spontaneous Writing

In further measurement and analysis of students' conceptual development of writing ability, subtests 6 - 7 were compiled and used to score students' Spontaneous Writing skills. The individual sum of scaled scores and composite index scores for the TOWL-4 Spontaneous Writing assessment were calculated for pre- and post-tests. The sum of scaled scores, percentile ranks, and composite index scores of Spontaneous Writing for both pre- and post-tests can be found in the following tables. Table 9 shows the data for Spontaneous Writing for sophomore participants in the control group, and Table 10 shows the data for Spontaneous Writing for sophomore participants in the experimental group.

Table 9
Control Group Individual Sophomore Student Spontaneous Writing Scores

Spontaneous Writing (subtests 6 and 7)							
	Sophomore Student	Sum of Scaled Scores		Percentile		Composite Index	
		Pre-	Post-	Pre-	Post-	Pre-	Post-
CONTROL GROUP	1	16	18	23	35	89	94
	2	7	8	<1	<1	56	62
	3	15	15	16	16	85	85
	4	17	20	30	50	92	100
	5	3	8	<1	<1	47	62
	6	14	16	12	21	82	88
	7	3	9	<1	1	47	65
	8	3	12	<1	5	47	75
	9	15	19	16	42	85	97
	10	13	19	7	42	78	97
	Mean	10.60	14.40			70.80	82.5

Table 10
Experimental Group Individual Sophomore Student Spontaneous Writing Scores

Spontaneous Writing (subtests 6 and 7)							
	Sophomore Student	Sum of Scaled Scores		Percentile		Composite Index	
		Pre-	Post-	Pre-	Post-	Pre-	Post-
EXPERIMENTAL GROUP	A	3	24	<1	81	47	113
	B	3	22	<1	68	47	107
	C	3	8	<1	<1	47	62
	D	3	22	<1	68	47	107
	E	3	14	<1	12	47	82
	F	3	25	<1	86	47	116
	G	3	23	<1	75	47	110
	H	9	18	<1	35	63	94
	I	3	23	<1	75	47	110
	J	3	20	<1	50	47	100
	K	3	18	<1	35	47	94
	L	3	15	<1	16	47	85
	M	10	21	1	61	67	104
	N	5	15	<1	16	50	85
	O	3	23	<1	75	47	110
	P	12	21	5	61	75	104
	Q	11	21	3	61	71	104
	R	3	24	<1	81	47	113
	S	3	4	<1	<1	47	49
	T	9	25	<1	86	63	116
	Mean	4.90	19.30			52.35	98.25

The mean scores for Sum of Scaled Scores and Composite Index were calculated for sophomores in the control group for Spontaneous Writing. The mean for the sum of scaled scores is 10.60 for the pre-test and 14.40 for the post-test with a 3.80 positive difference. The mean for the composite index is 70.8 for the pre-test and 82.50 for the post-test with an 11.70 positive difference. The percentile ranks ranged (low to high) from <1 to 30 for pre-test and <1 to 50 for post-test.

The mean scores for Sum of Scaled Scores and Composite Index were calculated for sophomores in the experimental group for Spontaneous Writing. The mean for the sum of scaled scores is 4.90 for the pre-test and 19.30 for the post-test with a 14.40 positive difference. The mean for the composite index is 52.35 for the pre-test and 98.25 for the post-test with a 45.90 positive difference. The percentile ranks ranged (low to high) from <1 to 5 for pre-test and <1 to 86 for post-test.

The individual sum of scaled scores and composite index scores for the TOWL-4 Spontaneous Writing assessments were calculated for pre- and post-tests. The sum of scaled scores, percentile ranks, and composite index of Spontaneous Writing for both pre- and post-tests can be found in the following tables. Table 11 shows the data for Spontaneous Writing for junior participants in the control group, and Table 12 shows the data for Spontaneous Writing for junior participants in the experimental group.

Table 11
Control Group Individual Junior Student Spontaneous Writing Scores

Spontaneous Writing (subtests 6 and 7)							
	Junior Student	**Sum of Scaled Scores**		**Percentile**		**Composite Index**	
		Pre-	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post-**
CONTROL GROUP	**1**	22	31	68	98	107	131
	2	8	3	<1	<1	62	47
	3	4	3	<1	<1	49	47
	4	26	31	90	98	119	131
	5	10	17	2	30	69	92
	6	11	9	3	<1	72	63
	7	11	14	3	12	72	82
	8	7	11	<1	3	59	71
	9	15	16	16	23	85	89
	10	9	8	1	<1	65	60
	11	4	14	<1	12	49	82
	Mean	11.54	14.27			73.45	81.36

Table 12
Experimental Group Individual Junior Student Spontaneous Writing Scores

Spontaneous Writing (subtests 6 and 7)							
	Junior Student	Sum of Scaled Scores		Percentile		Composite Index	
		Pre-	Post-	Pre-	Post-	Pre-	Post-
EXPERIMENTAL	A	14	21	10	61	81	104
	B	14	32	10	99	81	133
	C	11	22	3	68	72	107
	D	16	22	21	68	88	107
	E	13	27	7	92	78	121
	F	19	27	42	92	97	121
	G	16	18	21	37	88	95
	H	12	22	5	68	75	107
	I	14	25	10	86	81	116
	Mean	14.33	24.00			82.33	112.33

The mean scores for Sum of Scaled Scores and Composite Index were calculated for juniors in the control group for Spontaneous Writing. The mean for the sum of scaled scores is 11.54 for the pre-test and 14.27 for the post-test with a 2.73 positive difference. The mean for the composite index is 73.45 for the pre-test and 81.36 for the post-test with a 7.91 positive difference. The percentile ranks ranged (low to high) from <1 to 90 for pre-test and <1 to 98 for post-test.

The mean scores for Sum of Scaled Scores and Composite Index were calculated for juniors in the experimental group for Spontaneous Writing. The mean for the sum of scaled scores is 14.33 for the pre-test and 24.00 for the post-test with a 9.67 positive difference. The mean for the composite index is 82.33 for the pre-test and 112.33 for the post-test with a 30.00 positive difference. The percentile ranks ranged (low to high) from 3 to 42 for pre-test and 37 to 99 for post-test.

Overall Writing

Students' overall writing was assessed through the composite scores of the individual TOWL-4 subtests (subtests 1 - 7). Subtests 1 – 7 were compiled and used to score students' Overall Writing skills. The individual sum of scaled scores and the composite index scores for the TOWL-4 Overall Writing assessment were calculated for both pre- and post-tests. The sum of scaled scores, percentile ranks, and composite index scores of Overall Writing for both pre- and post-tests can be found in the following tables. Table 13 shows the data for Overall Writing for sophomore participants in the control group, and Table 14 shows the data for Overall Writing for sophomore participants in the experimental group.

Table 13
Control Group Individual Sophomore Student Overall Writing Scores

Overall Writing (subtests 1 – 7)									
	Sophomore Student	Sum of Scaled Score			Percentile		Composite Index		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	1	42	51	9	3	12	73	82	9
	2	23	28	5	<1	<1	54	59	5
	3	45	53	8	5	14	76	84	8
	4	55	53	-2	18	14	86	84	-2
	5	27	35	8	<1	1	58	66	8
	6	43	48	5	4	8	74	79	5
	7	18	24	6	<1	<1	48	55	7
	8	32	40	8	<1	3	63	71	8
	9	39	56	17	2	19	70	87	17
	10	44	54	10	5	16	75	85	10
	Mean	36.80	44.20	7.40			67.70	75.20	7.50

Table 14

Experimental Group Individual Sophomore Student Overall Writing Scores

Overall Writing (subtests 1 – 7)									
	Sophomore Student	**Sum Scaled Scores**			**Percentile**		**Composite Index**		
		Pre-	**Post-**	**Difference**	**Pre-**	**Post-**	**Pre-**	**Post-**	**Difference**
EXPERIMENTAL GROUP	**A**	22	55	33	<1	18	53	86	33
	B	39	58	19	2	23	70	89	19
	C	15	35	20	<1	1	45	66	21
	D	40	67	27	3	42	71	97	26
	E	34	69	35	1	47	65	99	34
	F	42	77	35	3	68	73	107	34
	G	18	62	44	<1	32	48	93	45
	H	43	71	28	4	53	74	101	27
	I	23	60	37	<1	27	54	91	37
	J	44	78	34	5	70	75	108	33
	K	32	68	36	<1	45	63	98	35
	L	34	53	19	1	14	65	84	19
	M	43	70	27	4	50	74	100	26
	N	30	54	24	<1	16	61	85	24
	O	25	69	44	<1	47	56	99	43
	P	54	63	9	16	35	85	94	9
	Q	39	62	23	2	32	70	93	23
	R	30	69	39	<1	47	61	99	38
	S	25	42	17	<1	3	56	73	17
	T	30	70	40	<1	50	61	100	39
	Mean	33.10	62.60	29.50			64.00	93.10	29.10

The mean scores for Sum of Scaled Scores and Composite Index were calculated for sophomores in the control group for Overall Writing. The mean for the sum of scaled scores is 36.80 for the pre-test and 44.20 for the post-test with a 7.40 positive difference. The mean for the composite index is 67.70 for the pre-test and 75.20 for the post-test with a 7.50 positive difference. The percentile ranks ranged (low to high) from <1 to 18 for pre-test and <1 to 19 for post-test.

The mean scores for Sum of Scaled Scores and Composite Index were calculated for sophomores in the experimental group for Overall Writing. The mean for the sum of scaled scores is 33.10 for the pre-test and 62.60 for the post-test with a 29.50 positive difference. The mean for the composite index is 64.00 for the pre-test and 93.10 for the post-test with a 29.10 positive difference. The percentile ranks ranged (low to high) from <1 to 16 for pre-test and 1 to 70 for post-test.

The individual sum of scaled scores and the composite index scores for the TOWL-4 Overall Writing assessment were calculated for both pre- and post-tests. The sum of scaled scores, percentile ranks, and composite index scores for Overall Writing for both pre- and post-tests can be found in the following tables. Table 15 shows the data for Overall Writing for junior participants in the control group, and Table 16 shows the data for Overall Writing for junior participants in the experimental group.

Table 15
Control Group Individual Junior Student Overall Writing Scores

Overall Writing (subtests 1 – 7)									
	Junior Student	**Sum of Scaled Scores**			**Percentile**		**Composite Index**		
		Pre-	**Post-**	**Difference**	**Pre-**	**Post-**	**Pre-**	**Post-**	**Difference**
CONTROL GROUP	**1**	37	67	30	1	42	68	97	29
	2	52	29	-23	13	<1	83	60	-23
	3	30	43	13	<1	4	61	74	13
	4	77	77	0	68	68	107	107	0
	5	35	46	11	1	6	66	77	11
	6	51	49	-2	12	9	82	80	-2
	7	57	61	4	21	27	88	91	3
	8	45	31	-14	5	<1	76	62	-14
	9	52	57	5	13	19	83	87	4
	10	27	35	8	<1	1	58	66	8
	11	37	54	17	1	16	68	85	17
	Mean	45.45	49.91	4.46			76.36	80.54	4.18

Table 16
Experimental Group Individual Junior Student Overall Writing Scores

Overall Writing (subtests 1 – 7)									
	Junior Student	**Sum of Scaled Scores**			**Percentile**		**Composite Index**		
		Pre-	**Post-**	**Difference**	**Pre-**	**Post-**	**Pre-**	**Post-**	**Difference**
EXPERIMENTAL	**A**	57	69	12	21	47	88	99	11
	B	34	79	45	1	73	65	109	44
	C	47	63	16	7	32	78	93	15
	D	52	66	14	13	39	83	96	13
	E	66	89	23	42	90	97	119	22
	F	73	88	15	58	89	103	118	15
	G	48	41	-7	8	3	79	72	-7
	H	48	71	23	8	53	79	101	22
	I	49	78	29	9	58	80	103	23
	Mean	52.66	71.55	18.89			83.55	101.11	17.56

The mean scores for Sum of Scaled Scores and Composite Index were calculated for juniors in the control group for Overall Writing. The mean for the sum of scaled scores is 45.45 for the pre-test and 49.91 for the post-test with a 4.46 positive difference. The mean for the composite index is 76.36 for the pre-test and 80.54 for the post-test with a 4.18 positive difference. The percentile ranks ranged (low to high) from <1 to 68 for pre-test and <1 to 68 for post-test.

The mean scores for Sum of Scaled Scores and Composite Index were calculated for juniors in the experimental group for Overall Writing. The mean for the sum of scaled scores is 52.66 for the pre-test and 71.55 for the post-test with an 18.89 positive difference. The mean for the composite index is 83.55 for the pre-test and 101.11 for the post-test with a 17.56 positive difference. The percentile ranks ranged (low to high) from 1 to 58 for pre-test and 3 to 90 for post-test.

Statistical Analysis

A statistical analysis of the students' Contrived Writing, Spontaneous Writing, and Overall Writing can be found in the following tables. Table 17 shows the data for Independent Samples Tests for sophomore participants, and Table 18 shows the data for Independent Samples Tests for junior participants. A statistical analysis of students' Overall Writing can also be found in the following tables. Table 19 shows the ANOVA data for sophomore participants, and Table 20 shows the ANOVA data for junior participants.

Table 17
Writing Scores of Sophomore Students

Independent Samples Test										
Sophomore Sum of Scaled Scores		**Levene's Test for Equality of Variances**		**t-test for Equality of Means**						
		F	**Sig.**	**t**	**df**	**Sig (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
Contrived Writing Post-test	Equal variances assumed	.014	.908	4.747	28	.000 **	13.350	2.812	7.590	19.110
	Equal variances not assumed			4.690	17.534	.000	13.350	2.847	7.358	19.342
Spontaneous Writing Post-test	Equal variances assumed	.025	.875	2.351	28	.026 *	4.900	2.084	.631	9.169
	Equal variances not assumed			2.487	21.020	.021	4.900	1.971	.802	8.998
Overall Writing Post-test	Equal variances assumed	.498	.486	4.275	28	.000 **	18.400	4.304	9.583	27.217
	Equal variances not assumed			4.169	16.967	.001	18.400	4.413	9.087	27.713

Note: * indicates statistically significant difference at the .05 level
** indicates statistically significant difference at the .01 level

Table 18
Writing Scores of Junior Students

Independent Samples Test										
Junior Sum of Scaled Scores		**Levene's Test for Equality of Variances**		**t-test for Equality of Means**						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
Contrived Writing Post-test	Equal variances assumed	.000	.990	2.510	18	.022 *	11.3636	4.5277	1.8513	20.8760
	Equal variances not assumed			2.443	14.861	.028	11.3636	4.6512	1.4418	21.2854
Spontaneous Writing Post-test	Equal variances assumed	2.690	.118	2.844	18	.011 *	9.7273	3.4201	2.5420	16.9125
	Equal variances not assumed			3.054	14.299	.008	9.7273	3.1853	2.9089	16.5457
Overall Writing Post-test	Equal variances assumed	.137	.715	3.225	18	.005 **	21.6465	6.7112	7.5467	35.7463
	Equal variances not assumed			3.237	17.445	.005	21.6465	6.6871	7.5653	35.7276

Note: * indicates statistically significant difference at the .05 level
** indicates statistically significant difference at the .01 level

Table 19
Overall Writing Scores of Sophomore Students

ANOVA						
Sophomore Overall Writing		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
SSS Pre-test	Between Groups	91.267	1	91.267	.831	.370
	Within Groups	3075.400	28	109.836		
	Total	3166.667	29			
SSS Post-test	Between Groups	2257.067	1	2257.067	18.274	.000 **
	Within Groups	3458.400	28	123.514		
	Total	5715.467	29			
% ile Pre-test	Between Groups	16.017	1	16.017	.645	.435
	Within Groups	347.733	14	24.838		
	Total	363.750	15			
% ile Post-test	Between Groups	3607.232	1	3607.232	12.628	.001 **
	Within Groups	7426.875	26	285.649		
	Total	11034.107	27			
Composite Index Pre-test	Between Groups	91.267	1	91.267	.803	.378
	Within Groups	3182.100	28	113.646		
	Total	3273.367	29			
Composite Index Post-test	Between Groups	2136.067	1	2136.067	18.127	.000 **
	Within Groups	3299.400	28	117.836		
	Total	5435.467	29			

Note: ** indicates statistically significant difference at the .01 level.

Table 20
Overall Writing Scores of Junior Students

ANOVA						
Junior Overall Writing		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
SSS Pre-test	Between Groups	257.473	1	257.473	1.483	.239
	Within Groups	3124.727	18	173.596		
	Total	3382.200	19			
SSS Post-test	Between Groups	2319.419	1	2319.419	10.403	.005 **
	Within Groups	4013.131	18	222.952		
	Total	6332.550	19			
% ile Pre-test	Between Groups	56.889	1	56.889	.141	.712
	Within Groups	6448.222	16	403.014		
	Total	6505.111	17			
% ile Post-test	Between Groups	4736.889	1	4736.889	7.557	.014 *
	Within Groups	10029.556	16	626.847		
	Total	14766.444	17			
Composite Index Pre-test	Between Groups	256.032	1	256.032	1.525	.233
	Within Groups	3022.768	18	167.932		
	Total	3278.800	19			
Composite Index Post-test	Between Groups	2093.584	1	2093.584	9.944	.005 **
	Within Groups	3789.616	18	210.534		
	Total	5883.200	19			

Note: * indicates statistically significant difference at the .05 level
** indicates statistically significant difference at the .01 level.

Independent Sample Tests were completed for Contrived, Spontaneous, and Overall Writing in the sum of scaled scores' post-tests. Independent Samples Test reflect that there was a significant effect (based upon equal variances assumption) on students' sum of scaled scores in Contrived Writing [$t(28) = 4.747$, $p = .000$], Spontaneous Writing [$t(28) = 2.351$, $p = .026$], and Overall Writing [$t(28) = 4.275$, $p = .000$] for sophomore student participants. Independent Samples Test reflect that there was a significant effect (based upon equal variances assumption) on students' sum of scaled scores in Contrived Writing [$t(18) = 2.510$, $p = .022$.], Spontaneous Writing [$t(18) = 2.844$, $p = .011$], and Overall Writing [$t(18) = 3.255$, $p = .005$] for junior student participants. Clearly, students learning English lessons with the color-embedded writing strategy scored higher than students not receiving the color-coded instruction. The significant difference in the sum of scaled scores' post-tests is such that the results suggest that the color enhancement did have an effect on students' holistic writing ability.

A one-way ANOVA analysis was conducted for the overall scores of pre- and post-tests for each of the three scales. Group 1 was delineated as the experimental group and Group 2 was delineated as the control group. The dependent variable was noted as the overall scores of each scale. On each of the scales, the pre-test means were not statistically significant between the control and experiment groups. In other words, this implies that both groups (experiment and control) were performing at the same level. The mean differences between the pre- and post-test on each of the three scales for sophomore students was statistically significant ($F= .831$, 18.274) for the sum of scaled scores, ($F= .645$, 12.628) for percentile scores, and ($F= .803$, 18.127) for composite index scores, respectively. The mean differences between the pre- and post-test on each of the

three scales for junior students was statistically significant (F= 1.483, 10.403) for sum of scaled scores, (F= .141, 7.557) for percentile scores, and (F= 1.525, 9.944) for composite index scores, respectively. Thus the experiment groups were higher than the control groups. This statistical significance suggests that the color-coding writing enhancement treatment does have an effect on the students' scores.

ANOVA results yielded significant concept acquisition; differences existed between those children learning English lessons with the color-coded enhancement strategy and those learning their English lessons without the color-coded enhancement. Table 19 shows statistically significant differences for sophomore experimental groups in overall writing post-test results for sum of scaled scores (F=18.274, p=.000) and for post composite index scores (F=18.127, p=.000). Table 20 shows statistically significant differences for the junior experimental group in overall writing post-test results for sum of scaled scores (F=10.403, p=.005) and for post composite index scores (F=9.944, p=.005). Results suggest that the color-code enhancement that was embedded within the writing strategy did affect student comprehension with a statistical significance for pre-testing and for post-testing.

Research Question 2: Does color-coding improve student written expression skills in the area organization and written fluency?

***Organization*:**

The TOWL-4 subtest 5, Sentence Combining, was used to measure writing organization. Subtest 5 was compiled and used to score students' organizational skills

within the written text. The individual raw scores and scaled scores for the TOWL-4 Sentence Combining assessment were calculated for pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Sentence Combining for both pre-and post-tests can be found in the following tables. Table 21 shows the data for the Sentence Combining subtest for sophomore participants in the control group, and Table 22 shows the data for the Sentence Combining subtest for sophomore participants in the experimental group.

Table 21
Control Group Individual Sophomore Student Sentence Combining Scores

Sentence Combining (subtest 5)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	**1**	5	9	4	16	37	7	9	2
	2	4	1	-3	9	2	6	4	-2
	3	1	8	7	2	37	4	9	5
	4	5	1	-4	16	2	7	4	-3
	5	4	0	-4	9	1	6	3	-3
	6	10	2	-8	50	2	10	4	-6
	7	0	0	0	1	1	3	3	0
	8	0	1	1	1	2	3	4	1
	9	0	8	8	1	37	3	9	6
	10	6	8	2	16	37	7	9	2
	Mean	3.50	3.80	0.30			5.60	5.80	0.20

Table 22
Experimental Group Individual Sophomore Student Sentence Combining Scores

Sentence Combining (subtest 5)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
EXPERIMENTAL GROUP	A	0	6	6	1	16	3	7	4
	B	8	11	3	37	63	9	11	2
	C	0	2	2	1	5	3	5	2
	D	9	14	5	37	84	9	13	4
	E	9	17	8	37	95	9	15	6
	F	9	11	2	37	63	9	11	2
	G	0	17	17	1	95	3	15	12
	H	2	12	10	5	63	5	11	6
	I	3	12	9	5	63	5	11	6
	J	11	14	3	63	84	11	13	2
	K	0	11	11	1	63	3	11	8
	L	7	10	3	25	50	8	10	2
	M	10	12	2	50	63	10	11	1
	N	6	10	4	16	50	7	10	3
	O	9	14	5	37	84	9	13	4
	P	12	14	2	63	84	11	13	2
	Q	2	7	5	5	25	5	8	3
	R	0	6	6	1	16	3	7	4
	S	0	6	6	1	16	3	7	4
	T	3	9	6	5	37	5	9	4
	Mean	5.00	10.75	5.75			6.50	10.55	4.05

The mean scores for the TOWL-4 subtest 5, Sentence Combining (range, 0 to 23), assessment were calculated for sophomores in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 3.50 for pre-test and 3.80 for post-test with a 0.03test difference. The mean for the scaled scores is 5.60 for pre-test and 5.80 for post-test with a 0.20 test difference. The percentile ranks ranged (low to high) from 1 to 50 for pre-test and 1 to 37 for post-test.

The mean scores for the TOWL-4 subtest 5, Sentence Combining (range, 0 to 23), assessment were calculated for sophomores in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 5.00 for pre-test and 10.75 for post-test with a 5.75 test difference. The mean for the scaled scores is 6.50 for pre-test and 10.55 for post-test with a 4.05 test difference. The percentile ranks ranged (low to high) from 1 to 63 for pre-test and 2 to 95 for post-test.

The individual raw and scaled scores for the TOWL-4 Sentence Combining assessment were calculated for both pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Sentence Combining for both pre- and post-tests can be found in the following tables. Table 23 shows the data for the Sentence Combining subtest for junior participants in the control group, and Table 24 shows the data for the Sentence Combining subtest for junior participants in the experimental group.

Table 23
Control Group Individual Junior Student Sentence Combining Scores

Sentence Combining (subtest 5)									
	Junior Student	**Raw Score**			**Percentile**		**Scaled Score**		
		Pre-	**Post-**	**Difference**	**Pre-**	**Post-**	**Pre-**	**Post-**	**Difference**
CONTROL GROUP	**1**	0	0	0	1	<1	3	2	-1
	2	13	0	-13	75	<1	12	2	-10
	3	6	11	5	16	50	7	10	3
	4	10	7	-3	50	16	10	7	-3
	5	5	0	-5	9	<1	6	2	-4
	6	10	12	2	50	50	10	10	0
	7	12	10	-2	63	37	11	10	-1
	8	12	0	-12	63	<1	11	2	-9
	9	9	9	0	37	25	9	8	-1
	10	4	8	4	5	25	5	8	3
	11	6	11	5	16	50	7	10	3
	Mean	7.90	6.18	-1.72			8.27	6.45	-1.82

Table 24
Experimental Group Individual Junior Student Sentence Combining Scores

Sentence Combining (subtest 5)									
	Junior Student	**Raw Score**			**Percentile**		**Scaled Score**		
		Pre-	**Post-**	**Difference**	**Pre-**	**Post-**	**Pre-**	**Post-**	**Difference**
EXPERIMENTAL	**A**	11	14	3	50	75	10	12	2
	B	9	9	0	37	25	9	8	-1
	C	10	11	1	50	50	10	10	0
	D	8	10	2	25	37	8	9	1
	E	14	16	2	75	84	12	13	1
	F	10	13	3	50	63	10	11	1
	G	0	8	8	1	25	3	8	5
	H	13	17	4	75	91	12	14	2
	I	7	15	8	25	84	8	13	5
	Mean	9.11	12.55	3.44			9.11	10.88	1.77

The mean scores for the TOWL-4 subtest 5, Sentence Combining (range, 0 to 23), assessment were calculated for juniors in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 7.90 for pre-test and 6.18 for post-test with a -1.72 test difference. The mean for the scaled score is 8.27 for pre-test and 6.45 for post-test with a -1.82 test difference. The percentile ranks ranged (low to high) from 1 to 75 for pre-test and <1 to 50 for post-test.

The mean scores for the TOWL-4 subtest 5, Sentence Combining (range, 0 to 23), assessment were calculated for juniors in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 9.11 for pre-test and 12.55 for post-test with a 3.44 test difference. The mean for the scaled score is 9.11 for pre-test and 10.88 for post-test with a 1.77 test difference. The percentile ranks ranged (low to high) from 1 to 75 for pre-test and 25 to 91 for post-test.

Fluency

The TOWL-4 subtest 7, Story Composition, was used to measure writing fluency. Subtest 7 was compiled and used to score students' fluency in writing ability. The individual raw scores and scaled scores for the TOWL-4 Story Composition assessment were calculated for pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Story Composition for both pre- and post-tests can be found in the following tables. Table 25 shows the data for the Story Composition subtest for sophomore

participants in the control group, and Table 26 shows the data for the Story Composition subtest for sophomore participants in the experimental group.

Table 25
Control Group Individual Sophomore Student Story Composition Scores

Story Composition (subtest 7)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	1	7	8	1	25	37	8	9	1
	2	1	1	0	<1	<1	2	2	0
	3	7	5	-2	25	9	8	6	-2
	4	9	10	1	50	63	10	11	1
	5	0	3	3	<1	2	1	4	3
	6	6	8	2	16	37	7	9	2
	7	0	2	2	<1	1	1	3	2
	8	0	3	3	<1	2	1	4	3
	9	5	7	2	9	25	6	8	2
	10	4	9	5	5	50	5	10	5
	Mean	3.90	5.60	1.70			4.90	6.60	1.70

Table 26
Experimental Group Individual Sophomore Student Story Composition Scores

Story Composition (subtest 7)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
EXPERIMENTAL GROUP	A	0	11	11	<1	75	1	12	11
	B	0	8	8	<1	37	1	9	8
	C	0	1	1	<1	<1	1	2	1
	D	0	10	10	<1	63	1	11	10
	E	0	6	6	<1	16	1	7	6
	F	0	11	11	<1	75	1	12	11
	G	0	10	10	<1	63	1	11	10
	H	2	8	6	1	37	3	9	6
	I	0	10	10	<1	63	1	11	10
	J	0	8	8	<1	37	1	9	8
	K	0	8	8	<1	37	1	9	8
	L	0	3	3	<1	2	1	4	3
	M	3	3	0	2	2	4	4	0
	N	1	5	4	<1	9	2	6	4
	O	0	10	10	<1	63	1	11	10
	P	3	8	5	2	37	4	9	5
	Q	3	9	6	2	50	4	10	6
	R	0	10	10	<1	63	1	11	10
	S	0	0	0	<1	<1	1	1	0
	T	4	13	9	5	91	5	14	9
	Mean	0.80	7.60	6.80			1.80	8.60	6.80

The mean scores for the TOWL-4 subtest 7, Story Composition (range, 0 to 21), assessment were calculated for sophomores in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 3.90 for pre-test and 5.60 for post-test with a 1.70 test difference. The mean for the scaled scores is 4.90 for pre-test and 6.60 for post-test with a 1.70 test difference. The percentile ranks ranged (low to high) from <1 to 50 for pre-test and <1 to 63 for post-test.

The mean scores for the TOWL-4 subtest 7, Story Composition (range, 0 to 21), assessment were calculated for sophomores in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 0.80 for pre-test and 7.60 for post-test with a 6.80 test difference. The mean for the scaled scores is 1.80 for pre-test and 8.60 for post-test with a 6.80 test difference. The percentile ranks ranged (low to high) from <1 to 5 for pre-test and <1 to 91 for post-test.

The individual raw and scaled scores for the TOWL-4 Story Composition assessment were calculated for both pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Story Composition for both pre- and post-tests can be found in the following tables. Table 27 shows the data for the Story Composition subtest for junior participants in the control group, and Table 28 shows the data for the Story Composition subtest for junior participants in the experimental group.

Table 27
Control Group Individual Junior Student Story Composition Scores

Story Composition (subtest 7)									
	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post	Difference
CONTROL GROUP	1	11	14	3	75	95	12	15	3
	2	2	0	-2	1	<1	3	1	-2
	3	0	0	0	<1	<1	1	1	0
	4	12	15	3	84	98	13	16	3
	5	4	7	3	5	25	5	8	3
	6	4	3	-1	5	2	5	4	-1
	7	4	3	-1	5	2	5	4	-1
	8	0	3	3	<1	2	1	4	3
	9	7	8	1	25	37	8	9	1
	10	4	4	0	5	5	5	5	0
	11	0	4	4	<1	5	1	5	4
	Mean	4.36	5.54	1.18			5.36	6.54	1.18

Table 28
Experimental Group Individual Junior Student Story Composition Scores

Story Composition (subtest 7)									
EXPERIMENTAL	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
	A	5	9	4	9	50	6	10	4
	B	8	15	7	37	98	9	16	7
	C	5	10	5	9	63	6	11	5
	D	8	8	0	37	37	9	9	0
	E	3	11	8	2	75	4	12	8
	F	8	12	4	37	84	9	13	4
	G	7	10	3	25	63	8	11	3
	H	5	10	5	9	63	6	11	5
	I	6	12	6	16	84	7	13	6
	Mean	6.11	10.77	4.66			7.11	11.78	4.67

The mean scores for the TOWL-4 subtest 7, Story Composition (range, 0 to 21), assessment were calculated for juniors in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 4.36 for pre-test and 5.54 for post-test with a 1.18 test difference. The mean for the scaled scores is 5.36 for pre-test and 6.54 for post-test with a 1.18 test difference. The percentile ranks ranged (low to high) from <1 to 84 for pre-test and <1 to 98 for post-test.

The mean scores for the TOWL-4 subtest 7, Story Composition (range, 0 to 21), assessment were calculated for juniors in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 6.11 for pre-test and 10.77 for post-test with a 4.66 test difference. The mean for the scaled scores is 7.11 for pre-test and 11.78 for post-test with a 4.67 test difference. The percentile ranks ranged (low to high) from 2 to 37 for the pre-test and 37 to 98 for the post-test.

Research Question 3: Does color-coding improve student written expression skills in the area of grammar and mechanics?

Punctuation

The TOWL-4 subtest 3, Punctuation, was one measure used to assess grammar and mechanics of writing. Subtest 3 was compiled and used to score students' punctuation skills. The individual raw scores and scaled scores for the TOWL-4 Punctuation assessment were calculated for pre- and post-tests. The raw scores,

percentile ranks, and scaled scores of Punctuation for both pre- and post-tests can be found in the following tables. Table 29 shows the data for the Punctuation subtest for sophomore participants in the control group, and Table 30 shows the data for the Punctuation subtest for sophomore participants in the experimental group.

Table 29
Control Group Individual Sophomore Student Punctuation Scores

Punctuation (subtest 3)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	1	0	1	1	1	2	3	4	1
	2	0	0	0	1	2	3	4	1
	3	8	4	-4	16	9	7	6	-1
	4	12	6	-6	37	16	9	7	-2
	5	6	6	0	9	16	6	7	1
	6	0	8	8	1	25	3	8	5
	7	0	1	1	1	2	3	4	1
	8	10	5	-5	25	9	8	6	-2
	9	11	9	-2	25	25	8	8	0
	10	9	10	1	16	37	7	9	2
	Mean	5.60	5.00	-0.60			5.70	6.30	0.60

Table 30
Experiment Group Individual Sophomore Student Punctuation Scores

Punctuation (subtest 3)									
	Sophomore Student	Raw			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
EXPERIMENTAL GROUP	A	7	16	9	16	63	7	11	4
	B	12	11	-1	37	37	9	9	0
	C	0	8	8	1	16	3	7	4
	D	12	20	8	37	84	9	13	4
	E	4	24	20	5	95	5	15	10
	F	12	25	13	37	95	9	15	6
	G	0	23	23	1	95	3	15	12
	H	11	23	12	25	95	8	15	7
	I	3	13	10	5	50	5	10	5
	J	11	25	14	25	95	8	15	7
	K	5	11	6	9	37	6	9	3
	L	5	3	-2	9	5	6	5	-1
	M	5	23	18	9	95	6	15	9
	N	2	8	6	2	25	4	8	4
	O	0	17	17	1	75	3	12	9
	P	10	9	-1	25	25	8	8	0
	Q	6	11	5	9	37	6	9	3
	R	7	16	9	16	63	7	11	4
	S	8	8	0	16	25	7	8	1
	T	6	17	11	9	75	6	12	6
	Mean	6.30	15.55	9.25			6.25	11.10	4.85

The mean scores for the TOWL-4 subtest 3, Punctuation (range, 0 to 26), assessment were calculated for sophomores in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 5.60 for pre-test and 5.00 for post-test with a -0.60 test difference. The mean for scaled scores is 5.70 for pre-test and 6.30 for post-test with a 0.60 test difference. The percentile ranks ranged (low to high) from 1 to 37 for pre-test and 2 to 37 for post-test.

The mean scores for the TOWL-4 subtest 3, Punctuation (range, 0 to 26), assessment were calculated for sophomores in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 6.30 for pre-test and 15.55 for post-test with a 9.25 test difference. The mean for the scaled scores is 6.25 for pre-test and 11.10 for post-test with a 4.85 test difference. The percentile ranks ranged (low to high) from 1 to 37 for pre-test and 5 to 95 for post-test.

The individual raw and scaled scores for the TOWL-4 Punctuation assessment were calculated for both pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Punctuation for both pre- and post-tests can be found in the following tables. Table 31 shows the data for the Punctuation subtest for junior participants in the control group, and Table 32 shows the data for the Punctuation subtest for junior participants in the experimental group.

Table 31
Control Group Individual Junior Student Punctuation Scores

Punctuation (subtest 3)									
	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	1	0	20	20	1	75	3	12	9
	2	11	16	5	37	50	9	10	1
	3	0	15	15	1	37	3	9	6
	4	16	20	4	63	75	11	12	1
	5	0	22	22	1	84	3	13	10
	6	17	19	2	63	63	11	11	0
	7	8	10	2	16	16	7	7	0
	8	10	11	1	25	16	8	7	-1
	9	4	16	12	5	50	5	10	5
	10	0	3	3	1	2	3	4	1
	11	13	17	4	50	50	10	10	0
	Mean	7.18	15.36	8.18			6.63	9.54	2.91

Table 32
Experiment Group Individual Junior Student Punctuation Scores

Punctuation (subtest 3)									
	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post	Difference
EXPERIMENTAL	A	11	21	10	37	75	9	12	3
	B	7	21	14	16	75	7	12	5
	C	11	15	4	37	37	9	9	0
	D	4	20	16	5	75	5	12	7
	E	15	25	10	50	91	10	14	4
	F	21	23	2	84	84	13	13	0
	G	1	5	4	2	5	4	5	1
	H	9	18	9	16	63	7	11	4
	I	7	19	12	16	50	7	10	3
	Mean	9.55	18.55	9.00			7.88	10.88	3.00

The mean scores for the TOWL-4 subtest 3, Punctuation (range, 0 to 26), assessment were calculated for juniors in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 7.18 for pre-test and 15.36 for post-test with an 8.18 test difference. The mean for the scaled scores is 6.63 for pre-test and 9.54 for post-test with a 2.91 test difference. The percentile ranks ranged (low to high) from 1 to 63 for pre-test and 2 to 84 for post-test.

The mean scores for the TOWL-4 subtest 3, Punctuation (range, 0 to 26), assessment were calculated for juniors in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 9.55 for pre-test and 18.55 for post-test with a 9.00 test difference. The mean for the scaled scores is 7.88 for pre-test and 10.88 for post-test with a 3.00 test difference. The percentile ranks ranged (low to high) from 2 to 84 for pre-test and 5 to 91 for post-test.

Logical Sentences

The TOWL-4 subtest 4, Logical Sentences was another assessment used to measure the grammar and mechanics of writing. Subtest 4 was compiled and used to score students' ability with discrete grammar skills. The individual raw and scaled scores for the TOWL-4 Logical Sentences assessment were calculated for pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Logical Sentences for both pre- and post-tests can be found in the following tables. Table 33 shows the data for the Logical Sentences subtest for sophomore participants in the control group, and Table 34 shows

the data for the Logical Sentences subtest for sophomore participants in the experimental group.

Table 33
Control Group Individual Sophomore Student Logical Sentences Scores

Logical Sentences (subtest 4)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTOL GROUP	**1**	11	11	0	37	37	9	9	0
	2	4	9	5	<1	16	2	7	5
	3	10	8	-2	25	9	8	6	-2
	4	12	10	-2	50	25	10	8	-2
	5	8	12	4	9	50	6	10	4
	6	11	7	-4	37	5	9	5	-4
	7	2	5	3	<1	1	1	3	2
	8	11	10	-1	37	25	9	8	-1
	9	0	11	11	<1	37	1	9	8
	10	9	8	-1	16	9	7	6	-1
	Mean	7.80	9.10	1.30			6.20	7.10	0.90

Table 34
Experiment Group Individual Sophomore Student Logical Sentences Scores

Logical Sentences (subtest 4)									
	Sophomore Student	Raw			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
EXPERIMENTAL GROUP	A	4	8	4	<1	9	2	6	4
	B	10	14	4	25	75	8	12	4
	C	0	8	8	<1	9	1	6	5
	D	9	9	0	16	16	7	7	0
	E	8	13	5	9	63	6	11	5
	F	9	12	3	16	50	7	10	3
	G	0	5	5	<1	1	1	3	2
	H	10	14	4	25	75	8	12	4
	I	5	10	5	1	25	3	8	5
	J	10	16	6	25	91	8	14	6
	K	17	20	3	95	99	15	18	3
	L	11	11	0	37	37	9	9	0
	M	6	12	6	2	50	4	10	6
	N	11	14	3	37	75	9	12	3
	O	6	11	5	2	37	4	9	5
	P	12	14	2	50	75	10	12	2
	Q	8	13	5	9	63	6	11	5
	R	6	13	7	2	63	4	11	7
	S	8	14	6	9	75	6	12	6
	T	6	14	8	2	75	4	12	8
	Mean	7.80	12.25	4.45			6.10	10.25	4.15

The mean scores for the TOWL-4 subtest 4, Logical Sentences (range, 0 to 22), assessment were calculated for sophomores in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 7.80 for pre-test and 9.10 for post-test with a 1.30 test difference. The mean for the scaled scores is 6.20 for pre-test and 7.10 for post-test with a 0.90 test difference. The percentile ranks ranged (low to high) from <1 to 50 for pre-test and 1 to 50 for post-test.

The mean scores for the TOWL-4 subtest 4, Logical Sentences (range, 0 to 22), assessment were calculated for sophomores in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 7.80 for pre-test and 12.25 for post-test with a 4.45 test difference. The mean for the scaled scores is 6.10 for pre-test and 10.25 for post-test with a 4.15 test difference. The percentile ranks ranged (low to high) from <1 to 95 for pre-test and 1 to 99 for post-test.

The individual raw and scaled scores for the TOWL-4 Logical Sentences assessment were calculated for both pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Logical Sentences for both pre- and post-tests can be found in the following tables. Table 35 shows the data for the Logical Sentences subtest for junior participants in the control group, and Table 36 shows the data for the Logical Sentences subtest for junior participants in the experimental group.

Table 35
Control Group Individual Junior Student Logical Sentences Scores

Logical Sentence (subtest 4)									
	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	1	0	0	0	<1	<1	1	1	0
	2	12	0	-12	50	<1	10	1	-9
	3	7	11	4	5	25	5	8	3
	4	15	16	1	84	84	13	13	0
	5	12	0	-12	50	<1	10	1	-9
	6	8	11	3	9	25	6	8	2
	7	12	17	5	50	91	10	14	4
	8	8	7	-1	9	2	6	4	-2
	9	13	13	0	63	50	11	10	-1
	10	5	7	2	1	2	3	4	1
	11	7	11	4	5	25	5	8	3
	Mean	9.00	8.45	-0.55			7.27	6.54	-0.73

Table 36
Experiment Group Individual Junior Student Logical Sentences Scores

Logical Sentences (subtest 4)									
	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
EXPERIMENTAL	A	12	13	1	50	50	10	10	0
	B	0	13	13	<1	50	1	10	9
	C	9	14	5	16	63	7	11	4
	D	12	12	0	50	37	10	9	-1
	E	11	15	4	37	75	12	13	1
	F	12	18	6	50	95	10	15	5
	G	13	0	-13	63	<1	11	1	-10
	H	10	16	6	25	84	8	13	5
	I	9	14	5	16	84	7	13	6
	Mean	9.77	12.77	3.00			8.44	10.55	2.11

The mean scores for the TOWL-4 subtest 4, Logical Sentences (range, 0 to 22), assessment were calculated for juniors in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 9.00 for pre-test and 8.45 for post-test with a -0.55 test difference. The mean for the scaled scores is 7.27 for pre-test and 6.54 for post-test with a -0.73 test difference. The percentile ranks ranged (low to high) from <1 to 84 for pre-test and <1 to 91 for post-test.

The mean scores for the TOWL-4 subtest 4, Logical Sentences (range, 0 to 22), assessment were calculated for juniors in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 9.77 for pre-test and 12.77 for post-test with a 3.00 test difference. The mean for the scaled scores is 8.44 for pre-test, 10.55 for post-test with a 2.11 test difference. The percentile ranks ranged (low to high) from <1 to 63 for pre-test and <1 to 95 for post-test.

Contextual Conventions

The TOWL-4 subtest 6, Contextual Conventions, was yet another assessment used to measure the grammar and mechanics of writing. Subtest 6 was compiled and used to score students' ability to write concisely and accurately, incorporating various grammar and mechanic rules. The individual raw and scaled scores for the TOWL-4 Contextual Conventions assessment were calculated for pre- and post-tests. The raw scores, percentile ranks, and scaled scores of Contextual Conventions for both pre- and post-tests can be found in the following tables. Table 37 shows the data for the

Contextual Conventions subtest for sophomore participants in the control group, and Table 38 shows the data for the Contextual Conventions subtest for sophomore participants in the experimental group.

Table 37
Control Group Individual Sophomore Student Contextual Conventions Scores

Contextual Conventions (subtest 6)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	1	11	13	2	25	37	8	9	1
	2	6	6	0	5	9	5	6	1
	3	9	13	4	16	37	7	9	2
	4	10	14	4	16	37	7	9	2
	5	0	3	3	<1	2	2	4	2
	6	9	9	0	16	16	7	7	0
	7	0	6	6	<1	9	2	6	4
	8	0	11	11	<1	25	2	8	6
	9	14	18	4	37	63	9	11	2
	10	12	14	2	25	37	8	9	1
	Mean	7.10	10.70	3.60			5.70	7.80	2.10

Table 38
Experiment Group Individual Sophomore Student Contextual Conventions Scores

Contextual Conventions (subtest 6)									
	Sophomore Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
EXPERIMENTAL GROUP	A	0	20	20	<1	75	2	12	10
	B	0	22	22	<1	84	2	13	11
	C	0	7	7	<1	9	2	6	4
	D	0	17	17	<1	63	2	11	9
	E	0	10	10	<1	16	2	7	5
	F	0	22	22	<1	84	2	13	11
	G	0	21	21	<1	75	2	12	10
	H	8	13	5	9	37	6	9	3
	I	0	21	21	<1	75	2	12	10
	J	0	17	17	<1	63	2	11	9
	K	0	14	14	<1	37	2	9	7
	L	0	17	17	<1	63	2	11	9
	M	8	31	23	9	99	6	17	11
	N	2	14	12	1	37	3	9	6
	O	0	19	19	<1	75	2	12	10
	P	11	20	9	25	75	8	12	4
	Q	9	17	8	16	63	7	11	4
	R	0	23	23	<1	84	2	13	11
	S	0	0	0	<1	1	2	3	1
	T	4	18	14	2	63	4	11	7
	Mean	2.10	17.15	15.05			3.10	10.70	7.60

The mean scores for the TOWL-4 subtest 6, Contextual Conventions (range, 0 to 22), assessment were calculated for sophomores in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 7.10 for pre-test and 10.70 for post-test with a 3.60 test difference. The mean for the scaled scores is 5.70 for pre-test and 7.80 for post-test with a 2.10 test difference. The percentile ranks ranged (low to high) from <1 to 37 for pre-test and 2 to 63 for post-test.

The mean scores for the TOWL-4 subtest 6, Contextual Conventions (range, 0 to 22), assessment were calculated for sophomores in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 2.10 for pre-test and 17.15 for post-test with a 15.05 test difference. The mean for the scaled scores is 3.10 for pre-test and 10.70 for post-test with a 7.60 test difference. The percentile ranks ranged (low to high) from <1 to 25 for pre-test and 1 to 99 for post-test.

The individual raw and scaled scores for the TOWL-4 Contextual Conventions assessment were calculated for both pre- and post-test. The raw scores, percentile ranks, and scaled scores of Contextual Conventions for both pre- and post-tests can be found in the following tables. Table 39 shows the data for the Contextual Conventions subtest for junior participants in the control group, and Table 40 shows the data for the Contextual Conventions subtest for junior participants in the experimental group.

Table 39
Control Group Individual Junior Student Contextual Conventions Scores

Contextual Conventions (subtest 6)									
	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
CONTROL GROUP	1	17	32	15	50	98	10	16	6
	2	5	0	-5	5	<1	5	2	-3
	3	0	0	0	1	<1	3	2	-1
	4	22	30	8	84	95	13	15	2
	5	6	15	9	5	37	5	9	4
	6	7	7	0	9	5	6	5	-1
	7	8	16	8	9	37	6	9	3
	8	8	12	4	9	16	6	7	1
	9	10	12	2	16	16	7	7	0
	10	2	2	0	2	1	4	3	-1
	11	0	17	17	1	37	3	9	6
	Mean	7.72	13.00	5.28			6.18	7.63	1.45

Table 40
Experiment Group Individual Junior Student Contextual Conventions Scores

Contextual Conventions (subtest 6)									
	Junior Student	Raw Score			Percentile		Scaled Score		
		Pre-	Post-	Difference	Pre-	Post-	Pre-	Post-	Difference
EXPERIMENT	A	11	21	10	25	63	8	11	3
	B	6	32	26	5	98	5	16	11
	C	6	21	15	5	63	5	11	6
	D	9	25	16	16	84	7	13	6
	E	14	30	16	37	95	9	15	6
	F	16	29	13	50	91	10	14	4
	G	11	11	0	25	16	8	7	-1
	H	8	21	13	9	63	6	11	5
	I	10	23	13	16	75	7	12	5
	Mean	10.11	23.66	13.55			7.22	12.22	5.00

The mean scores for the TOWL-4 subtest 6, Contextual Conventions (range, 0 to 22), assessment were calculated for juniors in the control group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 7.72 for pre-test and 13.00 for post-test with a 5.28 test difference. The mean for the scaled scores is 6.18 for pre-test and 7.63 for post-test with a 1.45 test difference. The percentile ranks ranged (low to high) from 1 to 84 for pre-test and <1 to 98 for post-test.

The mean scores for the TOWL-4 subtest 6, Contextual Conventions (range, 0 to 22), assessment were calculated for juniors in the experimental group for raw and scaled scores and test difference between the pre- and post-tests in each the raw and scaled scores. The mean for the raw scores is 10.11 for pre-test and 23.66 for post-test with a 13.55 test difference. The mean for the scaled scores is 7.22 for pre-test and 12.22 for post-test with a 5.00 test difference. The percentile ranks ranged (low to high) from 5 to 50 for pre-test and 16 to 98 for post-test.

Research Question 4: Does color-coding improve students' self-confidence and desire to write and create original written works?

The participant survey offered to the students in the experimental groups only consisted of two parts: (a) a LIKERT rating section with a five point rating scale consisting of fourteen statements and (b) a short answer section with five open-ended questions. This survey was the measure used to assess students' self-confidence and desire to write and create an original written work. The mean scores of the rated answers

were calculated for each of the fourteen statements. The individual students' ratings for each statement can be found in the following tables. Table 41 shows the data for the student survey answers for sophomore participants in the experimental group, and Table 42 shows the data for the student survey answers for junior participants in the experimental group.

Table 41
Sophomore Experimental Group Participant Survey Likert Responses

Sophomore Participant Survey Likert Responses														
Statement Number	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**#14**
STUDENTS	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	4	4	5	4	5	4	4	5	5	4	5	4	4	5
	4	4	4	4	5	5	4	3	3	5	5	5	5	3
	3	4	4	5	4	4	4	4	5	4	3	5	5	5
	5	5	5	4	5	4	5	5	4	4	4	4	4	5
	4	3	4	4	4	4	4	4	4	5	4	4	4	4
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	4	3	3	4	4	5	3	3	3	4	4	3	3	4
	5	5	5	4	4	5	4	4	4	5	5	5	5	5
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	4	5	4	4	4	3	4	4	4	5	5	4	5	3
	4	3	5	5	3	5	5	5	5	5	4	4	5	5
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	4	4	4	4	3	3	2	3	2	4	2	3	3	4
	4	5	5	4	4	3	5	3	4	4	3	3	4	4
	4	3	4	4	4	4	4	5	5	4	3	5	4	4
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	4.40	4.35	4.55	4.45	4.40	4.40	4.35	4.35	4.35	4.60	4.30	4.40	4.50	4.50

Table 42
Junior Experimental Group Participant Survey Likert Responses

Junior Participant Survey Likert Responses														
Statement Number	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**#14**
STUDENTS	4	3	4	5	4	4	5	5	5	4	4	5	4	5
	4	5	5	4	4	3	5	3	3	3	3	5	4	5
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	5	4	5	4	4	5	4	3	3	3	3	4	4	4
	4	4	5	5	4	4	4	5	5	5	4	4	4	4
	5	5	5	4	4	4	4	5	4	4	4	3	4	5
	3	4	5	4	5	4	5	4	5	4	5	4	5	4
	4	3	5	5	5	4	4	5	4	4	5	5	4	5
	5	5	5	5	4	4	5	5	5	5	4	5	5	5
Mean	4.41	4.29	4.80	4.58	4.30	4.24	4.51	4.46	4.40	4.36	4.07	4.41	4.41	4.63

The mean scores for the Participant Survey, (range, 0 to 5), assessment were calculated for students participating in the experimental groups only, sophomores (n=20) and juniors (n=9). The mean for statement 1 (I liked the 6 chosen colors) was 4.40 for sophomores and 4.41 for juniors. The mean for statement 2 (The 6 colors tied to nature were helpful) was 4.35 for sophomores and 4.29 for juniors. The mean for statement 3 (Using colors made the text easier to read) was 4.55 for sophomores and 4.80 for juniors. The mean for statement 4 (Highlighting the text with different colors helped me to separate the information by topics) was 4.45 for sophomores and 4.58 for juniors. The mean for statement 5 (Using colors helped me see different structures within the written information) was 4.40 for sophomores and 4.30 for juniors. The mean for statement 6 (The colors helped me recognize writing composition elements within individual paragraphs) was 4.40 for sophomores and 4.24 for juniors. The mean for statement 7 (the colors helped me identify various writing elements and details within sentences) was 4.35 for sophomores and 4.51 for juniors. The mean for statement 8 (The color code helped me to write better sentences) was 4.35 for sophomores and 4.46 for juniors. The mean for statement 9 (the color code helped me to write better paragraphs) was 4.35 for sophomores and 4.40 for juniors. The mean for statement 10 (The color code helped me to write better essays) was 4.60 for sophomores and 4.36 for juniors. The mean for statement 11 (The color code helped me to revise my writing) was 4.30 for sophomores and 4.07 for juniors. The mean for statement 12 (I believe using colors improved my lessons) was 4.40 for sophomores and 4.41 for juniors. The mean for statement 13 (I believe using colors improved my grades in the class) was 4.50 for sophomores and 4.41 for juniors. The mean for statement 14 (I enjoyed learning the color code) was 4.50 for

sophomores and 4.63 for juniors. All participant surveys' statements were rated with at minimum a 3 with one exception, a sophomore participant survey reflected statements 7, 9, and 11 as being rated with a 2, Disagree. No participant surveys reflected a rating of 1, Strongly Disagree.

Qualitative Findings

Qualitative findings were analyzed inductively, thus deriving concepts from the gathered data. A positive relationship was shown in students' attitudes, with respect to the color-coding enhancement (independent variable). A mixed methods data analysis was comprised of statistical relationships between five open-ended participant survey questions: (1) What was your favorite part of the color-coding?, (2) What was your least favorite part of the color-coding?, (3) Would you like to continue learning your English lessons using color?, (4) Will you continue to use the color-coding when writing and revising essays?, and (5) Do you think color-coding would help you learn the material in other courses?

To analyze the data, questions 1 and 2 involved student participants' experiences while learning the color-coding enhancement. Responses from each student participant were first grouped into one of two classifications: Teacher Instruction and Student Processing. Secondly, each student response was grouped into one of six categories for each classification. Each classification was broken into two rankings, favorite and least favorite, because of the wording in the questions. Three themes were found for each ranking. The themes for Teacher Instruction were: (1) Showing Differences, (2) Associative Reasoning, (3) Hidden Information, (4) Nothing, (5) Learning the Color-

Code, and (6) Particularities with Color. The themes for Student Processing were: (1) Highlighting Text, (2) Visualizing Information, (3) Graphic Organization, (4) Manipulation of 6 Colors, (5) Color Decisiveness, and (6) Time Consuming.

To further analyze the data, questions 3 and 4 involved student participants' decisiveness to continue using this learning strategy in English classes and when writing and revising future essays. Responses from each student participant were grouped into one of three classifications: *Yes*, *Maybe*, and *No*. Secondly, the framing of these questions inquired as to student participants' willingness to pursue color-coding in English classes and to produce original written works, so the student responses for the *Yes* classification were grouped into one of two themes, to study and to revise. Student responses necessitated a *Maybe* classification with one theme, potentially pursuing the color-coding enhancement with teacher support. Student responses, in accordance with the framing of these questions necessitated not only an acknowledgment factor (saying "Yes") but also the opposite, a refusal factor (saying "No"). Two themes were found within this classification, refusal to continue due to potential forgetfulness and refusal unless receiving needed guidance.

Further analysis of the data involved student participants' opinion to further use this learning strategy in other courses, besides English. Question 5 responses from each student participant were grouped into one of two classifications: *Yes* and *No*. Two themes were apparent within the *Yes* classification. Student responses reported using the learning strategy in other high school courses and in college courses.

To better communicate what is meant by each category, I have organized them into 3 tables: Table 43 for questions 1 and 2, Table 44 for questions 3 and 4, and Table 45 for question 5.

Table 43
Experiment Group Student Survey Responses to Questions 1 and 2

Questions 1 and 2			
Classification	**Rank**	**Themes / Categories**	**Description/Examples**
Teacher Instruction	Favorite	Showing Differences	This refers to: curriculum, lessons, and assignments
		Associative Reasoning	This refers to: the colors tie to nature's colors and the color use as a memory aid
		Hidden Information	This refers to: the different colors revealing particular content information as distinctive and emerging patterns within the textual information
	Least Favorite	Nothing	This refers to students' response to finding and experiencing nothing negative about the strategy
		Learning the Color-Code	This refers to: memory of what each color stands for and distinguishing text for each color
		Particularities with Colors	This refers to students' dislike of particular colors
Student Processing	Favorite	Highlighting Text	This refers to: parts of speech, sentences, paragraphs, essays, and informational text
		Visualizing Information	This refers to: parts of speech, sentences, paragraphs, essays, and informational text
		Graphic Organization	This refers to: parts of speech, sentences, paragraphs, essays, and informational text
	Least Favorite	Manipulation of 6 colors	This refers to: carrying 6 colors and viewing 6 colors at once
		Color Decisiveness	This refers to students' self confidence to: select a color in relation to writing components and apply the un-erasable color
		Time Consuming	This refers to time allotment to color: while reading and before finalizing writing

Table 44
Experiment Group Student Survey Responses to Questions 3 and 4

Question 3 and 4		
Classification	**Themes / Categories**	**Description/Examples**
Yes	To Study	This refers to: textbook information, instructional materials, and students' written notes
	To Revise	This refers to: students' original written products
Maybe	With Teacher Support	This refers to: teachers' initiative to instruct in this manner and students' receipt of instructional support
No	Will Forget	This refers to students' remembrance of each color designation, reasoning, and application
	Need Guidance	This refers to: students' lack of confidence to continue independently

Table 45
Experiment Group Student Survey Responses to Question 5

Question 5		
Classification	**Themes / Categories**	**Description/Examples**
Yes	In Other High School Courses	This refers to: textbook information, instructional materials, and students' written notes
	In College Courses	This refers to: textbook information, instructional materials, and students' written notes and also to students' original written products
No	Only in English Class	This refers to students' remembrance of each color designation

The design included a data transformation of the qualitative survey response data into quantitative percentages, which could then be compared by grade level and gender. The data were mixed in a complementary way, and the design can best be described as embedded.

First, the student participants were organized by grade level and gender simultaneously. Second, the percentages of students' responses from each grade level who mentioned each classification were calculated. The percentages of students' responses from each grade level who mentioned each theme were also calculated. Then, the percentages of students' responses from each gender who mentioned each classification were calculated. The percentages of students' responses from each gender who mentioned each theme were also calculated. Finally, the percentages of students' responses from each grade level and gender who mentioned each classification were calculated. The percentages of students' responses from each grade level and gender who mentioned each theme were also calculated.

Upon analyzing the data, three different tables to represent the percentages of students' responses who mentioned each classification and theme were created. The quantitative measure of student responses can be found in the following tables: Table 46, Table 47, and Table 48.

Table 46
Student Survey Responses

Question 1 and 2												
Class-ification	**Rank**	**Theme**	**10th Girls**		**10th Boys**		**Grade %**	**11th Girls**		**11th Boys**		**Grade %**
			#	**%**	**#**	**%**		**#**	**%**	**#**	**%**	
Teacher Instruction	**Favorite**	Showing Differences	6	60%	6	60%	60%	2	66%	6	100%	88%
		Associative Reasoning	4	40%	5	50%	45%	2	66%	4	66%	66%
		Hidden Information	5	50%	2	20%	35%	3	100%	5	83%	88%
	Least Favorite	Nothing	6	60%	5	50%	55%	2	66%	0	0	0
		Learning the Color-Code	1	10%	2	2%	15%	0	0	1	16%	11%
		Particularities with Colors	1	10%	2	20%	15%	0	0	1	16%	11%
Student Processing	**Favorite**	Highlighting Text	8	80%	6	60%	70%	2	66%	3	50%	55%
		Visualizing Information	9	90%	6	60%	75%	1	33%	6	100%	77%
		Graphic Organization	5	50%	8	80%	65%	3	100%	3	50%	66%
	Least Favorite	Manipulation of 6 Colors	3	30%	2	20%	25%	1	33%	3	50%	44%
		Color Decisiveness	0	0	3	30%	15%	0	0	2	33%	22%
		Time Consuming	2	20%	1	10%	15%	1	33%	2	33%	33%
Total Participants			10 girls		10 boys		-----	3 girls		6 boys		-----

Table 47
Student Survey Responses

Question 3 and 4											
Classification	**Theme**	**10th Girls**		**10th Boys**		**Grade %**	**11th Girls**		**11th Boys**		**Grade %**
		#	**%**	**#**	**%**		**#**	**%**	**#**	**%**	
Yes	To Study	10	100%	8	80%	90%	3	100%	6	100%	100&
	To Revise	8	80%	7	70	75%	3	100%	6	100%	100%
Maybe	With Teacher Support	2	20%	1	10%	15%	0	0	0	0	0
No	Will Forget	0	0	2	20%	10%	0	0	0	0	0
	Need Guidance	0	0	2	20%	10%	0	0	0	0	0
Total Participants		10 girls		10 boys		------	3 girls		6 boys		-----

Table 48
Student Survey Responses

Question 5											
Classification	**Theme**	**10th Girls**		**10th Boys**		**Grade %**	**11th Girls**		**11th Boys**		**Grade %**
		#	**%**	**#**	**%**		**#**	**%**	**#**	**%**	
Yes	In Other High School Courses	10	100%	8	80%	90%	3	100%	6	100%	100%
	In College Courses	3	30%	5	50%	40%	2	66%	4	66%	66%
No	Only in English Class	0	0	2	20%	10%	0	0	1	16%	11%
Total Participants		10 girls		10 boys		------	3 girls		6 boys		-----

The participant survey questions were divided into three sections because of the framing of the survey questions. Questions 1 and 2 revolved around students' experiences of favorite and least favorite issues with the color-coding enhancement; responses were coded as positive and negative issues. Responses appeared to include two perspectives, from the teaching standpoint (instructional) and the student's receipt of content material (student processing), so themes were found within each of those two classifications. Questions 3 and 4 revolved around student participants taking a definitive stand regarding their willingness to continue using the color-coding enhancement in English lessons and also when creating and revising original written products. Responses were either a yes or no, and all survey responses included a supporting explanation. Question 5 mainly revolved around a student's opinion of whether the color-coding enhancement would help them in their academic studies in other courses.

Questions 1 and 2, responses revealed six themes for each classification, instructional and student processing. Three themes were found for each perspective, positive (students' favorite aspects) and negative (students' least favorite aspects). These responses revolved around students' opinions of encountered issues regarding the color-coding enhancement that was embedded in the course instructional writing strategy, materials, and assessments. More positive remarks were made regarding the color-coding enhancement than negative remarks. In fact, eleven sophomore students (six girls and five boys) and two junior students (both girls) responded to question 2 (what is your least favorite) with the response of "Nothing". The boys generally made more negative remarks than the girls, in both grade levels with only two exceptions. Sophomore girl student participants responded more negatively than boys in only two areas; they

classified the manipulation of six colors as their least favorite encountered issue and that this enhancement was time consuming, using the color-coding system. In two instances of this reporting, that the color-coding was time consuming, the responses also stated that the time-consuming activity was well worth the effort as the content material became clearer to process and did enhance comprehension.

Also in questions 1 and 2, the student participant survey answers reflected more responses regarding student processing of information issues than instructional issues. In fact, the visualization theme, within the student processing classification, ranked highest in student responses. It could be that the student participants began to view the color-coding enhancement as a student strategy rather than as a teacher implemented technique.

Questions 3 and 4 revolved around students' decisiveness of whether they would choose to continue learning English lessons with the color-coding enhancement and more specifically whether they would choose to continue to use the color-coding enhancement to write and revise original written products. Responses were 100 percent affirmative with sophomore girls regarding the continuation in English lessons and 80 percent for the boys. Regarding the continuation to use the color-coding, when writing and revising original written compositions, 80 percent of the sophomore girls and 70 percent of the sophomore boys responded affirmatively. The juniors were unanimously affirmative regarding both questions. Only two themes were apparent in the 4 negative responses, choosing not to continue the color-coding due to feelings of potential forgetfulness and need of guidance. These boys stated that although they did like the color-coding enhancement, they felt continuing this strategy would not be feasible due to potentially forgetting the manner in which to implement the color-coding techniques and needing

guidance in order to continue using it. Also, three students were indecisive regarding questions 3 and 4. The only theme that was apparent was a desire for teacher support in order to continue implementing the color-coding enhancement.

Question 5 revolved around students' opinion of future use, in other courses, of the color-coding enhancement. Responses reflected two themes, continued use in high school and use in college. Although student answers were unanimous for juniors in further using the color-code strategy in high school, the sophomore students differed slightly. Sophomore girls' responses were favorable but sophomore boys in agreement to continue color-coding totaled 80 percent. Approximately half the student participants stated interest in further using the color-coding enhancement strategy in college.

CHAPTER V

DISCUSSION

The purpose of this study was to determine the effectiveness of a color-coding embedded writing strategy on the writing performance of adolescents with mild-moderate disabilities. Specifically, the intent was to show that the use of color as a visual image and support enhances students' understanding and application of the writing process by making written expression patterns more clear, logical, and manageable. Adding a color-code schema to a proven writing strategy would result in students effectively constructing procedural knowledge and improving their writing skills.

To evaluate the actual impact of the color-coding writing intervention, an experimental design using pre- and post-assessments with sophomore and junior special education English classes was employed to determine writing changes. That is, comparisons of students' performance on a standardized writing assessment was made between the control group of students who learned the English lessons through the use of a writing strategy and the experimental group of students who learned the English lessons with the same writing strategy but with the embedded color-coding.

Theoretical Frame and Purpose

Grounded in the constructivist theory that posits learning as a discovery and construction of information rather than simply the receipt of essential information, this research study focused on providing an inductive learning intervention model. This instructional approach supported the belief that students who learn how to discern and create knowledge for themselves develop deeper awareness and comprehension on content and skill implementation. For this project, the intervention focused on improving the understanding of the structure of written language and its individual components to enhance writing knowledge and skill by using a color-embedded writing strategy. The color-coding component was used to help students' comprehension of how writing unites words into sentences and ideas into coherent topics that narrate, describe, persuade, or explain.

Teachers must be adept at utilizing research-based teaching practices and effective learning strategies to differentiate instruction to effectively address students' various learning styles (Sofia, 2010). Undifferentiated text presents no interactive elements to aid interpretations of the written content, potentially hindering not only the remembrance but also the recall of information. Researchers and teachers alike have been interested in the best methods to use when teaching students how to write more effectively. Researchers have found that instruction on writing structure and elements is most successful when lessons are taught that reinforce the validity of word usage and arrangement, reinforcing the communicative positioning of words and groups of words (Urowitz & Bozzato, 1992).

Conclusions

The study results showed a clear, consistent difference in the impact of the two interventions with the experimental groups who were taught the color-embedded writing strategy demonstrating greater improvement in their conceptual development as well as actual writing skills. Moreover, those same students also reported feeling better about the writing and their own writing abilities. The overall study findings would suggest that color can be a powerful tool for teaching skills to students with mild-moderate disabilities.

Research Question 1: Does color-coding improve student written expression skills in the area of conceptual development?

Students' conceptual development was measured by comparing composite performance scores for pre- and post-tests in the areas of Contrived, Spontaneous, and Overall Writing derived from the TOWL-4 standardized assessment.

The Contrived Writing composite was derived from the aggregation of subtests 1 through 5 (vocabulary, spelling, punctuation, logical sentences, and sentence combining). Data showed that both sophomore and junior students in the experimental groups outperformed their peers who comprised the control groups. The experimental groups showed increases from pre- to post-test scores with substantial percentage increases. These increases would suggest that students in the experimental groups were more proficient in the mechanics, organization, and fluency, of written expression isolated

skills and in the development of foundational skills into broader themes. The composite test performances revealed students in the experimental groups were more able to discover coherent patterns within the text and draw inferences in situations even if they lacked direct experience with the written content.

The experimental groups showed more progress in their abilities to organize concepts hierarchically and into categories providing discriminability among the written text, as evident from contrived writing scores. Ninety-three percent of the student participants reflected an increase in Contrived Writing pre- to post-test scores. So, out of twenty-nine students in the experimental groups, only one student showed no increase and another showed a decrease in conceptual development, as evident from the pre- and post- Contrived Writing test scores. Thus, in the experimental groups, sophomore students showed a 53.01% increase, and junior students showed a 22.61% increase in Contrived Writing sum of scaled scores whereas in the control groups, sophomores showed a 12.87% increase, and juniors showed a 5.10% increase.

The Spontaneous Writing composite was derived from the individual performances of subtests 6 and 7 (contextual conventions and story composition). Data showed that both sophomore and junior students in the experimental groups once again outperformed their peers who comprised the control groups. The experimental groups showed an increase from pre- to post-test scores with substantial percentage increases. These increases would suggest that students in the experimental groups were more proficient in composition writing as evident from the Spontaneous Writing pre- and post-test scores.

Although 75% of the sophomores in the experimental group show lower pre-test scores than the sophomores in the control group, the experimental sophomore groups showed more progress in their ability to create and organize their thoughts into a narrative story from a pictorial prompt, as evident from Spontaneous Writing test scores. As a result, in the experimental groups, sophomore students showed a 293.87% increase, as compared to sophomores in the control group who showed a 35.84% increase in sum of scaled scores. Likewise, in the experimental group, junior students showed a 67.48% increase and junior students in the control group showed a 23.65% increase in sum of scaled scores. In fact, 10% of the sophomore students in the control group showed no change in pre- and post-test scores, and 36% of the junior students in the control group showed a decrease in Spontaneous Writing tests scores from pre- to post-test. All students in the experimental groups showed an increase from pre- to post-test scores in Spontaneous Writing.

The Overall Writing composites were derived from the aggregated performances of subtests 1 through 7 and estimate the quality of students' written expression. These subtests individually assess isolated skills in written expression and together assess writing expression conceptually. The contrived index estimates students' general writing ability while the spontaneous index estimates students' general writing competence.

Adding the color-coding to grammar concepts enabled students to form probabilistic representations between the concept and various features. This added a causal relation to an existing theory; it added an embedded support promoting skill construction to existing learning strategies. Much like the work by Kajs et al. (1998) who

found that the addition of color improved students' ability to associate particular colors to specific grammar functions, this study improved students' understanding of the elements of writing as discrete skills but also translated to the creation of written text. Similarly, students using the color-embedded writing strategy in this study were more able to recognize specific ideas and relationships within textual information. Likewise, students were more readily, with the added color, able to distinguish broad topics within the text and recognize the smaller, more specific details supporting the individual topic ideas.

According to students' comments provided through the Participant Survey, the embedded color scheme gave the written content cue validity and visibility, enhancing students' information content awareness and written text development. While clearly a writing strategy is an effective teaching model as students in both the control and experimental groups showed increases in Spontaneous Writing scores, the color-embedded writing strategy had a greater impact on student performance. Ninety percent of the sophomore students and 63% of the junior students in the control groups reflected an increase from pre- to post-test scores whereas 100% of the students in the experimental groups had an increase from pre- to post-test scores in Spontaneous Writing.

In addition, the color-embedded intervention had a greater overall impact on the students' performance. Students in the experimental groups showed larger post-test gains than students in the control groups. In the experimental group, sophomores showed a 25.93% increase, and juniors showed an 11.86% increase whereas in the control groups, sophomores showed a 6.03% increase and juniors showed a 2.36% increase in Contrived Writing composite index scores. In the experimental group, sophomores showed an

87.67% increase, and juniors showed a 36.43% increase whereas in the control groups, sophomores showed a 16.52% increase and juniors showed a 10.76% increase in Spontaneous Writing composite index scores. These results are congruent with research conducted by Hendricks, Trueblood, and Pasnak (2006) where students learned rules via added color at a greater rate than their peers without the color enhancement. Similarly, this research study supports the idea that students who use color to distinguish content in isolation can scaffold the learned content into a broad theme. Colored dimensions to information allow students to see how ideas fit together; it shows organization of information, enhancing development of further ideas.

Reconstruction of previous knowledge or content in isolation into unified themes occurs with more ease when following a schematic. The added color allows for students to recall more easily specific details and application purposes. Students in the experimental groups were more readily able to create a narrative style written document from a pictorial prompt and edit the written work than students in the control groups. Overall, these students did also increase in the length of their writing sample. This study also revealed that students' percentile ranks were at a minimal range and substantially increased in the experimental groups. Students in the experimental groups advanced to the "Average" composite index. The control groups, on the other hand, represented composite indexes that although did increase, did not increase to the average range, remaining in the "Poor" or "Below Average" range. Hence, students in the experimental groups showed an 89.12% increase in sophomore scores and a 35.86% increase in junior scores for sum of scaled scores in Overall Writing. Students in the control groups

showed a 20.10% increase in sophomore scores and a 9.81% increase in junior scores for sum of scaled scores in Overall Writing.

The color scheme also seemed to enhance the students' ability to draw inferences from existing text. The Overall Writing assessment scores indicated whether students had acquired minimal contextual material; higher scores suggest that students learned the fundamental skills of good writing whereas lower scores may be highlighting a less refined understanding of the basic elements of the writing system.

During the testing phase of the study, students' approach to writing was observed and changes were noted. Students in both the experimental and control groups were slow to engage in the writing-related tasks during the pre-test phase. Students were reluctant to continue through each subtest during the pre-testing phase, claiming they did not know any further answers. However, this timidity changed for students in the experimental groups (both sophomore and junior grade levels) during post-testing. They were more willing and motivated to complete the subtests and to create written text during the post-testing phase. Moreover, the students in the experimental groups spoke up more during the post-test phase, asking questions of clarification or excitedly stating aloud what information found in the assessment that they knew and specifically remembered from class instructional lessons presented in class.

Research Question 2: Does color-coding improve student written expression skills in the area organization and written fluency?

The second research question, focusing on organizational skills and writing fluency, was addressed by comparing students' pre- and post- TOWL-4 subtest scores. The Sentence Combining and Story Composition subtests, used to measure the organization and fluency skills, showed increased scores for both the control and experimental groups. However, the experimental group, whose pre-test average was lower than the control group, outscored the control group on the post-test by 5 points or 50% more growth. This improvement would suggest that the increase in organization and written fluency skills was because students had developed stronger conceptual skills that supported their ability to more effectively categorize information.

Although learning strategies help to present content information in varied ways, the color-embedded writing strategy seemed to add visual support that helped students to recognize and organize content confirming previous researchers work addressing strategies for improving student focus, effectively presenting information structures, and identifying textual patterns using color (Schraeder, 1997 a, b; Styne, 1986; Viau, 1998a, b). Color-coding text helped students segment and organize composition writing. Students in the experimental groups were better able to combine sentences in the Sentence Combining subtest of the TOWL-4 because they were able to delineate the various segments of a sentence with the designated colors allowing them to see various organizational possibilities. That is, students more easily categorized sentence segments and were able to arrange them and associatively combine them.

Both sophomore and junior students in the experimental groups showed more growth than those students in the control groups when looking at their pre- and post-tests on the Sentence Combining subtest. In fact, the sophomore experimental groups showed a mean increase of 5.75 points from pre- to post-test as compared to the sophomore control group's growth of a 0.30 point increase in their post-test mean. That is a 115% growth compared to an 8.57% growth, respectively. Similarly, the junior experimental group students reflected a 3.44 point increase, a 37.76% growth from pre-test to post-test, whereas the junior students in the control group showed no growth from pre-test to post-test. Clearly, the embedded color-coding enhancement impacted students' awareness of the textual information, enhancing their understanding of associative relationships and improving their organizational skills.

Measuring writing fluency involved the writing of an original narrative based on a picture of a realistic scene involving a fire. The factors examined on this measure were students' ability to compose a story sequence, create a logical storyline with characters, and use appropriate and varied vocabulary. Both the control and experimental groups were shown the sample picture and read an example story before being asked to begin writing. During the pre-test phase, approximately 80% of the students in both groups looked at the picture but did not write very much text. Six students did not write anything, receiving a "0" on that assessment. At the end of the allotted time, they stated that they could not figure out how to start the story, thus the reasoning for writing nothing.

At the post-testing phase, sophomore and junior students in the experimental group reflected a significant increase in their writing fluency scores moving from a mean

pre-test score of 0.80 to a post-test mean of 7.60. This is an 850% increase. These students, scoring less than the control group for the pre-test, scored significantly higher than the control group for the post-test. The sophomore students representing the control group showed a 43.58% increase. Learning the content with a color-coding embedded writing strategy helped students to better visualize the written information and manipulate it. Manipulation of the information enhanced students' content knowledge by visually seeing how the informational content can be organized and reorganized. Although the juniors in the control group reflected a 27.06% increase in pre- to post-test scores, junior students in the experimental group showed a 76.26% increase in pre- to post-test scores. Adding a color-coding scheme to the content material meant students could see particular divisions and subdivisions of the written content and potentially see emerging patterns through the emergence and arrangement of particular colors. Clearly, students in the experimental groups showed further academic growth in the area of writing fluency as measured by their ability to create a quality-evaluated original composition with a developing plot, vocabulary, characters, event circumstances, and interest to the readers. Research over the past two decades has supported the use of color to highlight and differentiate textual information and structures in written text (Sofia, 2010; Lipstein & Renninger, 2007; & Schraeder, 1997 b). This research study, in the same way, confirms that color facilitates the visualization of topic idea funneling because it is easier to follow particular word patterns and flow of thought when it is visible with designated colors. Understanding information placement and logistics of informative and supportive information helped students with idea expression and communication of intended purpose as evident by story composition scaled scores.

Research Question 3: Does color-coding improve student written expression skills in the area of grammar and mechanics?

Subtests Punctuation, Logical Sentences, and Contextual Conventions were used to measure the grammar and mechanics of students' writing skills. The increase in experimental group students' post-test grammar and mechanics' post-test scores can be explained by their improved ability to recognize and classify various aspects and segments within a sentence.

Skills in the area of grammar and mechanics were observed for both groups, but more significantly for the experimental groups. Students in both groups experienced difficulties capitalizing and punctuating sentences making numerous corrections during the pre-test phase but showed improvement in their post-test scores and approach to the assessment task. During the post-test process, students within the experimental groups worked quickly, seemed confident in their initial approach to the error correction procedure, and made few corrections to their initial answers.

Punctuation indicates the structure and organization of written language and the intonation of writing, helping to disambiguate the meaning of the written text. Thus, adding color helped students to visualize punctuated structures, as evident by the steady increase in experimental group subtest scores. Sophomores in the experimental groups showed a 146.82% increase in raw test scores while the sophomores in the control group showed no increase. In fact, the sophomore students in the control group scored 10.71% lower on the post-test task.

A key part of the color-embedded writing strategy was using the color to highlight the relationships of composition elements in written text. Marzano's research (2005, 2001) supports the teaching of skills as a system rather than in isolation to help students recognize concept relationships. Adding color gives an abstract domain a concrete structure. Keeping this in mind, the added color-coding helped students to not only see the individual aspects of grammar but also the procedural mechanics of each grammar rule. Hence, this research study's color-embedded enhancement to the writing strategy facilitates students visualizing emerging patterns and perceiving relational qualities to construct procedural knowledge about grammar mechanics.

The Logical Sentences subtest uses sentences with illogical sense and grammatical errors to measure students' ability to apply grammar and mechanics to make sentences sensical. During the pre-test process, many of the students in both groups stopped before completing half of the sentences. During the post-test process, all of the experimental group students completed the test whereas the control group students did not all finish the test. Moreover, the experimental group showed a vast improvement in their ability to use appropriate proper grammar rules and mechanics. The sophomore control group did show some growth, 16.66% increase whereas the junior students in the control group showed no growth. But, the growth in the experimental groups showed a 57.05% increase for sophomores and a 30.68% increase for juniors.

Students can identify individual aspects within the written text with more ease when diverse functional multimodal applications are involved in the original presentation and processing of the content material, using multimodal applications in instructional presentations (Kress and Van Leeuwen, 2002, 2001). Furthering their idea of multimodal

presentations, this research study focused on the idea that six colors forming a specific color-code offered a visual format for written information. Students in the experimental groups applied the color-code scheme to see the arrangements within the written text. Similarly, many researchers support the notion that students need to interact with the content material in order to construct a new knowledge base of information (Kress & Van Leeuwen, 1996, Kress et al., 2001, Lemke, 2000, O'Toole, 1994). In the same way, students in the experimental groups used color to understand the communicative potential within various arrangements of the informational text, enhancing their processing and assimilation of information.

The Contextual Conventions subtest measures the ability to apply the rules governing punctuation of sentences and capitalization of words while incorporating the use of complex sentences comprised of introductory and concluding clauses, and grammatical forms such as subject-verb agreement. These skills are assessed from the student's original story writing task. Students in both groups improved their grammar and mechanics skills. Yet, while sophomore and junior control groups showed growth in writing skills with mean increases of 50.70% and 68.24% respectively, their level of increase was much less when compared to the experimental groups where sophomores showed a 716.66% increase and juniors showed a 134.07% increase from pre- to post-test scores.

Much like Gorman and Eastman's (2010) research that found that students can more readily explore specific associations and patterns, drawing parallels within the textual information, increasing the fluency of content information, this study resulted in similar findings. The added color helped students more easily associate similar content

driven sentences because of the visual medium on the written text; therefore, improving their sequencing of information. Likewise, students in this research study used the color as a visual support when presented information to investigate, explore, and specify associations for interpreting written text.

Adding the color-coding allowed students to individualize concepts and ideas. It provided students a way to visualize discrete skills and follow the written content representative of the discrete skill, seeing how that concept works within sentences, paragraphs, and essays. Students were better able to understand the individual grammar skills through the addition of color because the color gave abstract concepts a more concrete function. Even if students could not remember the particular grammar concept they could remember the color and thus refresh their memories as to the function the color represented. The color worked as a prompt which led to superior learning. Information retention was evident.

Research Question 4: Does color-coding improve students' self-confidence and desire to write and create original written works?

A participant survey was used with the experimental groups to provide a means of feedback on students' self-confidence and desire to write and create original written works. Many educators and researchers have expressed concern about the ideal way of teaching writing concepts to learners with mild-moderate disabilities. It has been suggested that commonly used methods of instruction simply offer the informational content in various manners rather than reinforce various learning needs of students with

mild-moderate disabilities. Instructional approaches and learning strategies although offer various manners in which to present the content information, would not necessarily offer students a motivational reason to continue working.

Color-coding the written text seems to improve students' self-confidence and desire to continue with academic assignments. During the post-test phase, students wrote more sentences on the subtests and appeared to put forth more effort when editing the written work. In fact, many students vocalized the learned designated colors as they worked through the subtests. The post-test narrative story showed improvement regarding the quantity of written text for students in the experimental groups which may be a result of the students' improved self-confidence and approach to writing. Overall, the students showed increases in writing fluency in the Contextual Conventions and Story Composition subtests. The length of the story does have a positive relationship with overall writing quality; students were better able to develop their ideas into coherent sentences. In fact, many students commented on the desire to color-code their narrative stories in order to properly proofread their written work.

Much like Lipstein and Renninger (2007), this research study found that creating leaning environments helped students engage in self-analysis regarding their course work and improved students' attitudes and affect toward learning. More specifically, the color-embedded writing strategy addressed commonly reported student apathy toward learning by engaging them in determining what was important in the content. Students in the experimental groups were able to determine the grammar rules and procedures because the added color-coding made written textual structures visible, enhancing students'

ability to accurately identify contextual patterns and construct their own personal knowledge based upon their observations.

Participant survey answers were reflective of students' appreciation of the color-coding writing strategy enhancement and the familiarity the different colors brought to the written content. Means for each statement were generally high with 4.07 or above (0 strongly disagree to 5 strongly agree) for both experimental groups. In fact, the answers given were very positive, falling mainly within the "Agree" and "Strongly Agree" ratings. The first three statements dealt with students' perceptions of the color-code scheme. The sophomore and junior mean scores for the three responses were 4.43 and 4.5, respectively. The next eight statements dealt with the students' perceptions of the helpfulness of the color-coding scheme with experimental groups' mean responses of 4.4 to 4.35, sophomores to juniors, respectively. The last three statements dealt with the students' perceptions about how helpful the color-coding scheme was that year and its potential usefulness in future academic courses. The experimental groups' means were 4.46 and 4.48 sophomores and juniors, respectively.

Students' open-ended responses on the participant survey were also reflective of students' appreciation of the color-coding writing strategy enhancement. Common positive themes arose regarding student perceptions on the color-coding schematic. Students' reported liking the chosen colors and the fact that these same colors were associated with nature and daily lives, stating for example, "*The orange, which means it is an adjective, describes the yellow, which means it is a noun/subject, because we can see orange in the yellow sunsets.*" Students also remarked on the fact that the color-coding made the words on the paper "*jump-out*", stating, "*This 'visualness' made it*

easier for me to see where the story ideas were going and flowing." In fact, according to many of the students' comments, students "*really liked being able to move information around*" in order to create "*new sentences and ideas*". Students' perceived themes revolved around the color effect on the written text: that colors helped students recognize differences, associate reasoning, and visibly portray content information.

Recommendations

For Theory and Theory–Related Research

This study used an evidence-based teaching strategy with an added color-coded enhancement. However, student growth data from the experimental groups as compared to the control groups strongly support the strength of the embedded color-coding on students' writing ability. It was expected that all of the students would improve in their content awareness, writing skills, and written expression fluency because they received daily direct instruction in a well-designed and evidence-based writing strategy. However, the experimental groups who received the color-coding enhancement showed much more growth than the control groups, suggesting that color effectively helps students focus on targeted content and skills within other instructional approaches. This study further supports the fact that all students can benefit from this color-coding writing strategy because of the diversity (e.g. gender, race/ethnicity, and disability category) of students represented within the experimental groups. Students who were English Language Learners showed similar patterns of improvement. Thus, the color-coded intervention could potentially be successfully applied to this population as well.

Implications for Future Research

Students with mild-moderate disabilities have historically struggled to acquire grade level skills in common core areas as measured by standardized assessments. Effective instructional strategies that utilize systematic learning approaches have been created over the years and are often employed with uneven results. It is important to continue to develop and modify current practices so that they are more effective for our students.

We already know that strategic, sequential writing strategies help students with mild-moderate disabilities improve their composition skills. This study expanded that knowledge to determine how color-coding could enhance the writing strategy. Data from this study is very clear that the experimental groups receiving the color-coded embedded writing strategy performed significantly better than the control groups. While these findings are very exciting, it is just one research study. Further research is important that focuses on not just the use of color but the application of meaning to those colors to support content principles. For example, it would be valuable to determine the effectiveness of visual presentations with a unified color-coding schematic in other areas of basic skills like mathematics or science. If those learners can increase their performance levels using visual modalities in their learning, they might then be able to move more quickly through the basic content material and into more advanced content, allowing them to potentially close the gap between their performance level and their grade level. Therefore, research should focus on this academic area of growth, instructional presentation with color enhancement that has a unified reasoning, for all

academic areas to determine effective instructional practice for students with mild-moderate disabilities.

Final Thoughts

Writing is an essential skill needed for academic success in all curricular areas. Students' writing ability is directly related to the course performance and grade, which may be negatively affected by poor written expression skills. By extension, students' writing performance can also affect students' access to post-secondary educational and/or vocational opportunities. For this reason, I began with a proposition asking what if a visual learning system was emphasized in the special education English curriculum to help students improve their writing skills. The system would be grounded in three principles: colors associated with society and perception as starting points; meta-conceptual links between visual and verbal texts; and the art of visualization in sentence, paragraph, and essay proficiency. The emphasis on sensory experience, perceptual thinking, and visualization is a deliberate attempt to challenge reason, critical thinking, and linearity of thought that have come to dominate the teaching of writing in contemporary English classrooms. Typically in such classrooms, critical-thinking skills in various forms are emphasized, such as the ability to write a narrative, descriptive, expository, or persuasive argument using logical reasoning or the ability to write an informed response by analyzing and evaluating a given text. The problem, however, is that by prioritizing critical thinking in the writing process, other forms of thought, particularly visual thinking, may be undermined, particularly for learners who need more concrete conceptual bridges. This curriculum was, therefore, designed to take into

account the need to include both critical and visual forms of thought through a multimodal approach to teaching writing. The significance of an approach such as this is that visual texts become more accessible for students who need additional cognitive inputs.

Overall, the participants in this study showed improvements in their writing. Significant growth was evident in the pre-test post-test data for student participants in the experimental groups. In addition, the intervention effects were observed beyond the special education English course in written works for other classes.

This study attests to the importance of student interaction with writing components to improve writing skill mastery in understanding, manipulation, retention, and retrieval of content material knowledge. Information regarding the effectiveness of this strategy could benefit all students as well as those who struggle to learn in highly abstract learning environments.

REFERENCES

Abbott, R. D., & Berninger, V. W. (1993). Structural equation modeling of relationships among development sills and writing skills in primary- and intermediate-grade writers. *Journal of Education Psychology, 85*, 478-508.

Alley, G., & Deshler, D. (1979). *Teaching the Learning Disabled Adolescent: Strategies And Methods*. Denver CO: Love Publishing.

Applebee, A. N., & Langer, J. L. (2006). The state of writing instruction on American's schools: What existing data tell us. New York: Center on English Learning & Achievement, 1-31.

Bertram, D. "Likert Scale". CPSC 681: Topic Report, 1-10.

Berninger, V., Abbott, R., Whitaker, D., Sylvester, L., & Nolen, S. (1995). Integrating low-level and high-level skills in instructional protocols for writing disabilities. *Learning Disability Quarterly, 18*, 293-309.

Berninger, V. W., & Swanson, H. L. (1994). Modifying Hayes and Flower's model of skilled writing to explain beginning and developing writing. In J. S. Carlson (Series Ed.) & E. C. Butterfield (Vol. Ed.), Advances in cognition and education practice, vol. 2: Children's writing: Toward a process theory of the development of skilled writing (pp. 57-81). Greenwich, CT: JAI Press.

Bezemer, J., & Kress, G. (2008). Writing in Multimodal Texts: A social semiotic account of designs for learning. *Written Communication, 25*(2), 166-195.

Biggerstaff, M., Halloran, B., & Serrano, C. (1994). Use color to assess mathematics problem solving. *Teacher to Teacher: Focus Issue*, 307-308.

Black, J. (1993). *The effects of auditory and visual stimuli on tenth graders' descriptive writing*. U.S. Department of Education, Office of Educational Research and Improvement Center (ERIC), 1-22.

Boslow, S. A., Phelan, J. E., & Capoloslo, L. (2006). Gender patterns in college students' choices of their best and worst professors. *Psychology of Women Quarterly, 30*, 25-35.

Boyle, J. & Scanlon, D. (2010). *Methods and strategies for teaching students with mild disabilities: A case –based approach.* Belmont, CA: Wadsworth, Cengage Learning.

Brockmann, J. (1991). The unbearable distraction of color. *IEEE Transactions on Professional Communication 34*(3), 153-159.

Bruning, R. & Horn, C. (2000). Developing motivation to write. *Educational Psychologist, 35*(1), 25-37.

Bush, J. & Zuidema, L. A. (2011). Professional Writing in the English classroom. *English Journal, 100*(4), 86-89.

Cotos, E. (2011). Potential of automated writing evaluation feedback. *CALICO Journal, 28*(2), 420-459.

Creswell, J. W. & Plano-Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage Publications, Inc.

Crotty, M. (1999). *The foundations of social research: Meaning and perspective in the research process*. London: Sage Publications.

Dagenais, D., & Beadle, K. (1984). Written language: When and where to begin. *Topics in Language Disorders, 4*, 59-85.

Danoff, B., Harris, K R., & Graham, S. (1993). Incorporating strategy instruction within the writing process in the regular classroom: Effects on the writing of students with and without learning disabilities. *Journal of Reading Behavior, 25*(3), 295-322.

De La Paz, S. (2001). Teaching writing to students with attention deficit disorders and specific language impairment. *Journal of Educational Research, 95*, 37-47.

De La Paz, S. (1999 a). Self-regulated strategy instruction in regular education setting: Improving outcomes for students with and without learning disabilities. *Learning Disabilities Research and Practice, 14*, 92-106.

De La Paz, S. (1999 b). Teaching writing strategies and self-regulation procedures to middle school students with learning disabilities. *Focus on Exceptional Children, 31*, 1-16.

De La Paz, S., & Graham, S. (1997). Strategy instruction in planning: Effects on the writing performance and behavior of students with learning difficulties. *Exceptional Children, 63*, 167-181.

Deshler, D., & Schumaker, B. (2006). *Teaching adolescents with disabilities:Accessing the general education curriculum*. Thousand Oaks, CA: Corwin.

Deshler, D., & Schumaker, B. (1988). An instructional model for teaching students how to learn. In J. Graden, J. Zins, & M. Curtis (Eds.), *Alternative educational delivery systems: Enhancing instructional options for all students* (pp.391-411). Washington, DC: National Association for School Psychologists.

Doyle, L., Lovett, A. M., Pellicci, D. (2001). Strategies for improving writing in third grade. Graduate Thesis, Illinois: Chicago.

Dyson, A. H. (2007). Literacy "basics" in childhood spaces: A critical perspective on the "basics". In Yetta Goodman & Prisca Martens (Eds.), *Critical issues in early literacy* (pp. 153-174). Mahwah, HJ: Erlbaum.

Ellis, E. S., & Colvert, G. (1996). Writing strategy instruction. In D. D. Deshler, E. S. Ellis, & B. K. Lenz (Eds.), *Teaching adolescents with learning disabilities* (2nd ed., pp. 127-207). Denver, CO: Love Publishing Company.

Englert, C. S., Mariage, T. V., Okolo, C. M., Shankland, R. K., Moxley, K. D., Courtad, C. A., Jocks-Meier, B. S., O'Brien, J. C., Martin, N. M., & Chen, H. (2009). The learning-to-learn strategies of adolescent students with disabilities. *Assessment for Effective Intervention, 34*(3), 147-161.

Englert, G. S. & Mariage, T. (2003). The sociocultural model in special education interventions: Apprenticing students in higher-order thinking. In L. H. Swanson, K. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 450-467). New York: Guilford.

Englert, G. S., Raphael, T. E. & Anderson, L. M. (1992). Socially mediated instruction: Improving students' knowledge and talk about writing. *The Elementary School Journal 92,* AW-449.

Englert, G. S. & Mariage, T. (1991). Shared understandings: Structuring the writing Experience through dialogue. *Journal of Learning Disabilities, 24*, 330-342.

Englert, C. S., Raphael, T. E., Anderson, L. M., Anthony, H. M., & Steven, D. D. (1991). Making strategies and self-talk visible: Writing instruction in regular and special education classrooms. *American Educational Research Journal, 28*, 337-372

Farrar, B. L. (1991). The colour of words. *Guides: Classroom Use: Teaching Guides*, 1-6.

First, C. G., MacMillan, B., Levy, C. (1995). Writing process versatility: Demonstrates versatility through the use of three prewriting activities with color-coded clustering. *Intervention in School and Clinic, 31*(1), 21-27.

Flower, L., & Hayes, J. (1980). The dynamics of composing: Making plans and juggling constraints. In L. Gregg & R. Steinberg (Eds.), Cognitive processes in writing (pp. 31-50). Hillsdale, NJ: Erlbaum.

Freed, J., Kloth, A., & Billett, J. (2006). Teaching the gifted visual spatial learner. *Understanding Our Gifted, 18*(4), 3-6.

Gardner, H. (2006). *Multiple intelligences: New horizons*. New York: Basic Books.

Gardner, H. (2004). Audiences for the theory on multiple intelligences. *Teachers College, 103*(1), 1-9.

Gardner, H. (1997). Multiple intelligences as a partner in school improvement. *Educational Leadership*, 20-21.

Gardner, H. (1993). *Multiple Intelligences: Theory in Practice*. New York: Basic Books.

Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

Gargiulo, R.M. (2012). *Special education in contemporary society: An introduction to exceptionality*, Thousand Oaks: Sage.

Gorman, R. & Eastman, G. S. (2010). "I see what you mean": Using visuals to teach metaphoric thinking in reading and writing. *English Journal, 100*(1), 92-99.

Graham, S. & Harris, K. R. (2009). Evidence-based writing practices: Drawing recommendations from multiple sources. *British Journal of Educational Psychology (monograph series), 6*, 95-111.

Graham, S. & Harris, K. R. (2005). *Writing better: Effective strategies for teaching students with learning difficulties*. Baltimore: Brookes.

Graham, S. & Harris, K. R. (2003). Students with LD and the process of writing: A meta-analysis of SRSD studies. In H.L. Swanson, K.R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 323-344). New York: Guilford Press.

Graham, S., Harris, K. R., & Larsen, L. (2001). Prevention and intervention of writing difficulties for students with learning disabilities. *Learning Disabilities Research & Practice, 16*, 74-84.

Graham, S. & Harris, K. R. (1989). Improving learning disabled students' skills at composing essays: Self-instructional strategy training. *Exceptional Children, 56*, 201-214.

Graham, S., & MacArthur, C. (1988). Improving learning disabled students' skills at revising essays produced on a word processor: Self-instructional strategy training. *Journal of Special Education, 22*, 133-152.

Graham, S., MacArthur, C. A., Schwartz, S. S., & Page-Voth, V. (1992). Improving the compositions of students with learning disabilities using a strategy involving product and process goal setting. *Exceptional Children, 58*, 322-334.

Graves A. W., Valles, E. C., & Rueda, R. (2000). Variations in interactive writing instruction: A study in four bilingual special education settings. *Learning Disabilities Research &Practice, 15*(1), 1-9.

Greenberg, S. (2010). CRAP: Contrast, repetition, alignment, proximity. N.p., n.d. Presentation slide. 8 July 2010. Retrieved March 30, 2012. <pages.cpsc.ucalgary.ca/~saul/581/presentations/05-crap/CRAP.ppt>

Guzel-Ozmen, R. (2006). The effectiveness of modified cognitive strategy instruction in writing with mildly mentally retarded Turkish students. *Council for Exceptional Children, 72*(3), 281-297.

Haber, R. (1970). How we remember what we see. *Scientific American, 222*, 104-112.

Hallenbeck, M. J. (2002). Taking charge: Adolescents with learning disabilities assume Responsibility for their own writing. *Learning Disability Quarterly, 25*, 227-246.

Hallenbeck, M. J. (1997). From the inside out: Adolescents with learning disabilities think and talk about writing. Unpublished doctoral dissertation, Michigan State University, East Lansing.

Hallenbeck, M. J. (1996). The cognitive strategy in writing: Welcome relief for adolescents with learning disabilities. *Learning Disabilities Research and Practice, 11*, 107-119.

Hammill, D. D. & Larsen, S. C. (2009). *Test of Written Language*-4. Austin, TX: Pro-Ed Inc.

Harris, K.R. & Graham, S. (2007). Chapter 8: "Marconi Invented the Radio So People Who Can't Afford TVs Can Hear The News" *Research on Teaching Powerful Composition Strategies We Have and Research We Need*. Shaping Literacy Achievement: Research We Have, Research We Need. Edited by: M. Pressley, A. K. Billman, K. H. Perry, K. E. Reffitt, & J. Moorhead Reynolds. New York: Guilford Press.

Harris, K. R. & Graham, S. (1992). Self-regulated strategy development: A part of the writing process. In M. Pressley, K. Harris, & J. Guthrie (Eds.), Promoting Academic Competence and Literacy in Schools. San Diego: Academic Press.

Hayes, (2006). chapter excerpt from Guilford Publications. Handbook of Writing Research, Edited by Charles A. MacArthur, Steve Graham, and Jill Fitzgerald, p. 28-40.

Hayes, J. R. (1996). A new framework for understanding cognition and affect in writing. In Levy, C. M., and Ransdell, S. (eds.), *The science of writing: Theories, methods, individual differences, and applications*, Lawrence Erlbaum Associates, Publishers, Mahwah, NJ, pp. 1-27.

Hayes, J. R. & Flower, L. S. (1980). Identifying the organization of writing processes. In L. Gregg & E. Steinberg (Eds.), *Cognitive processes in writing: An interdisciplinary approach* (pp. 3-30). Hillsdale, NJ: Erlbaum.

Hayes, G. R., Hirano, S., Marcu, G., Monibi, M., Nguyen, D., & Yeganyen, M. (2010). Interactive visual supports for children with Autism. *Pers Ubiquit Comput, 14*, 663-680.

Hendricks, C. Trueblood, L., & Pasnak, R. (2006). Effects of teaching patterning to 1st graders. *Journal of Research in Childhood Education, 21*(1), 79-89.

Hesse-Biber, S. N. & Leavy, P. (2004). *Approaches to qualitative research: A reader on theory and practice*. New York, NY: Oxford University Press.

Horton, W. (1991). Overcoming chromophobia: A guide to the confident and appropriate use of color. *IEEE Transactions on Professional Communication 34*(3) 160-171.

Jewitt, C. (2007). A multimodal perspective on textuality and contexts. *Pedagogy, Culture &Society, 15*(3), 275-289.

Johannessen. L. R. (2004). Helping "struggling" students achieve success. *Journal of Adolescent & Adult Literacy, 47*(8), 638-647.

Kabuto, B. (2009). Color as a semiotic resource in early sign-making. *Early Childhood Research & Practice, 11*(2), 1-18.

Kajs, L. T., Alaniz, R., Willman, E., & Sifuentes, E. (1998). Color-coding keyboard functions to develop kindergartners' computer literacy. *Journal of Computing in Childhood Education, 9*(2), 107-111.

Kaufer, D. & Butler, B. (2000). *Designing Interactive Worlds with Words: Principles of writing as Representational Composition*. Mahwah: Erlbaum, 2000. Print.

Kavale, K. A. (2005). Identifying specific learning disability: Is Response to Intervention the answer? *Journal of Learning Disabilities, 38*(6), 553-562.

Kavale, K. A. (1995). Setting the record straight on learning disability and low achievement: The tortuous path of ideology. *Learning Disabilities Research & Practice, 10*, 145-152.

Keyes, E. (1993). Tutorial: Typography, color, and information structure. *Technical Communication*, p. 638-654.

Kirschenbaum, V. R. (2006). The old way of reading and the new. *Educational Leadership*, 47-50.

Klassen, R. (2002). A question of calibration: A review of the self-efficacy beliefs of students with learning disabilities. *Learning Disability Quarterly, 25*(2), 88-102.

Kosslyn, S. M. (1980). *Image and Mind*. Cambridge, MA: Harvard Univ. Press.

Kress, G. (2003). *Literacy in the new media age*. New York: Routledge.

Kress, G. Jewitt, C., Ogborn, J., & Tsatsarelis, C. (2001). *Multimodal teaching and learning. The rhetorics of the science classroom*. London: Continuum.

Kress, G. & van Leeuwen, T. (2002). Colour as a Semiotic Mode: Notes for a grammar of colour. *Visual Communication, 1*(3), 343-368.

Kress, G. & van Leeuwen, T. (2001) Multimodal discourse. *The Modes and Media of Contemporary Communication*, London: Edward Arnold.

Kress, G. & van Leeuwen, T. (1996). Reading images. *The Grammar of Visual Design*, London/New York.

Lambert A., Roser, M., Wells, I., & Heffer, C. (2006). The spatial correspondence hypothesis and orienting in response to central and peripheral spatial cues. *Visual Cognition, 13*(1), 65-88.

Lange, B. S. (1983). Toni Morrison's rainbow code. *Critique*, 173-181.

Leigh, S. R. (2010). Violent red, ogre green, and delicious white: Expanding meaning potential through media. *Language Arts, 87*(4), 252-262.

Lemke, J. (2000). Introduction: Language and other semiotic systems in education. *Linguistics and Education, 10*(3), 307-334.

Levy, G. D., & Peters, W. W. (2010). Undergraduates' views of best college courses. *Teaching Of Psychology, 29*, 46-48.

Lewis, R., Graves, A., Ashton, T., & Kieley, C. (1997). Enhancing writing skills of students with learning disabilities. *Learning Disabilities Research & Practice, 11*, 212-220.

Lipstein, R. & Renninger, K. A. (2007). "*Putting things into words": the development of 12-15-year-old students' interest for writing*. In G. Rijlaarsdam (Series Ed.) and P. Boscolo & S. Hidi (Volume Eds.), Studies in Writing, Volume 19, Writing and Motivation (pp. 113-140). Oxford: Elsevier.

Longo, P. J. (2001). What happens to student learning when color is added to a new knowledge representation strategy? Implications from visual thinking networking. Paper Presented: National Association of Science Teachers, March 5-28, 2001, 42p.. Retrieved from: http://www.umassd.edu/cas/biology

Lujan, H. L. & DiCarlo, S. E. (2006). Too much teaching, not enough learning: What is the solution? *Advances in Physiology Education, 30*, 17-22.

MacArthur, C. A. & Graham, S. (1987). Learning disabled students' composing under three methods of text production: Handwriting, word processing, and dictation. *Journal of Special Education, 21*, 22-42.

MacArthur, C. A., Schwartz, S., & Graham, S. (1991). Effects of a reciprocal peer revision strategy in special education classrooms. *Learning Disabilities Research and Practice, 6*, 201-210.

Martin, D. (2008). The authors gallery: A meaningful integration of technology and writing. *Middle School Journal, 39*(4), 12-17.

Marzano, R. J. (2011). It's how you use a strategy. *The Resourceful School, 69*(4), 88-89.

Marzano, R. J. (2005). *School leadership that works: From research to results*. Alexandria, VA: Association for Supervision & Curriculum.

Marzano, R. J. (2001). *Designing a new taxonomy of educational objectives. Experts in assessment*. Corwin Press. Inc., A Sage Publications Company, CA: Thousand Oaks.

Marzano, R. J., Gaddy, B. B., & Dean, C. (2000). *What works in classroom instruction*. Aurora, CO: Mid-continent Research for Education and Learning.

Marzano, R. J., Norford, J. S., Paynter, D. E., Pickering, D. J., & Gaddy, B. B. (2001). *A handbook for classroom instruction that works*. Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement.* ASCD

McCrimmon, A. W., & Climie, E. A. (2011). Test Review: Test of Written Language – Fourth Edition. *Journal of Psychoeducational Assessment, 29*(6), 592-596.

McRel. (2005). *Research into practice series: Classroom instruction that works: Participant's Manual*. Sandy, Utah: School Improvement Network.

Merriam-Webster's Collegiate Dictionary (10th ed.). (1999). Springfield, MA: Merriam-Webster, Inc.

Merriam, S. B. & Associates. (2002). *Qualitative research in practice: Examples for discussion and analysis*. San Francisco, CA: Jossey-Bass.

Moody, A. K. (2012). Family connections: Visual supports for promoting social skills in young children: A family perspective. *Childhood Education, 88*(3), 191-194.

Moran, S. Kornhaber, M. & Gardner, H. (2006). Orchestrating Multiple Intelligences. *Educational Leadership*, 22-27.

Mowat, N. (2004). Inspiration for integration: Effective use of visual learning tools to improve student learning. *Medium, 29*(1), 8-9,26.

National Commission on Writing. (2003, April). *The neglected R: The need for a writing revolution.* Available www.collegeboard.com

National Commission on Writing. (2004, September). *Writing: A ticket to work. . . or a ticket out: A survey of business leaders.* Available www.collegeboard.com

O'Toole, M. (1994). *The Language of Displayed Art*. Leicester: Leicester University Press.

Paivio, A. (1983). "*The empirical case for dual coding.*" In *Imagery, memory and cognition*, edited by J. C. Yuille. Hillsdale, NJ: Erlbaum, pp. 307–332.

Paivio, A. (1971). *Imagery and Verbal Processes*. New York, N.Y.: Holt, Rinehart, and Winston.

Paxman, C. (2011). Map your way to speech success! Employing mind mapping as a speech preparation technique. *Communication Teacher 25*(1), 7-11.

Perry, N. & Drummond, L. (2002). Helping young students become self-regulated researchers and writers. *The Reading Teacher, 56*(3), 298-310.

Persky, H. R., Daane, M. C., & Jin, Y. (2003). *The nation's report card: Writing 2002.* (NCES 2003–529). U.S. Department of Education. Institute of Education Sciences. National Center for Education Statistics. Washington, DC: Government Printing Office.

Peters, E. E. & Levin, J. R. (1986). Effects of a mnemonic imagery strategy on good and poor readers' prose recall. *Reading Research Quarterly, 21*, 179-192.

Piaget, J. (1966). *Psychology of intelligence*. Totowa, New Jersey: Littlefield, Adam and Co.

Plano Clark, V. L. & Creswell, J. W. (2008). *The mixed methods reader*. Thousand Oaks, CA: Sage Publications, Inc.

Pruisner, P., A. P. (1993). *From Color to Color Cue: Remembering Graphic Information*. Paper presented at the Annual Conference of the International Visual Literacy Association. Rochester, New York.

Rao, S. M. & Gagie, B. (2006). Learning through seeing and doing: Visual supports for children with Autism. *Teaching Exceptional Children, 38*(6), 26-33.

Rogoff, B. (1995). Observing sociocultural activities on three planes: participatory appropriation, guided appropriation and apprenticeship. In J V Wertsch, P Del Rio and A Alverez (eds.) Sociocultural studies of the mind. Cambridge University Press, Cambridge, pp 139-164.

Rogoff, B. (1990). Apprenticeship in thinking - cognitive development in social context New York: Oxford University Press.

Schraeder, L. L. (1997 a). Using relevancy and color to explain or persuade. *Reports – Descriptive, 141*, 2-11.

Schraeder, L. L. (1997 b). The effectiveness of color coding on middle school students' ability to differentiate explicit from implicit information in narrative and expository texts. *Reports – Research, 143,* 1-21.

Schumaker, J. B., Sheldon, J. B., Sheldon-Sherman, J., Schumaker, J., Sheldon-Sherman, B., Schumaker, S., & Lyerla. (1999). *Learning strategies curriculum*. Center for Research on Learning, University of Kansas, Lawrence, KS. www.ku-crl.org

Sexton, M., Harris, K. R., & Graham, S. (1998). Self-regulated strategy development and the writing process: Effects on essay writing attributions. *Exceptional Children, 64*, 295-311.

Sofia, C. A. (2010). Bringing lessons from homeschool to the writing classroom. *English Journal, 100*(2), 98-104.

Stoddard, B., & MacArthur, C. (1993). A peer editor strategy: Guiding learning disabled students in response and revision. *Research in the Teaching of English. 27*, 76-103.

Styne, M. M. (1986). Poems by computer: Introducing poetry in a high-tech society. *Viewpoints, 120*, 1-25.

Tarasovic, J. (2011). In search of the perfect sentence. *The Writer, 124*(3), 26-29.

Thompson, M. (2008). Multimodal teaching and learning: Creating space for content teachers. *Journal of Adolescent & Adult Literacy 52*(2), 144-153.

Tomlinson, B. (2006). Developing classroom materials for teaching to learn. In J. Mukundan (Ed.), *Focus on ELT Materials* (pp77-82). Selangor: Pearson Longman

Tomlinson, B. (Ed.). (1998). *Materials Development in Language Teaching*. Cambridge: Cambridge University Press.

Troia, G. A., Graham, S., & Harris, K. R. (1999). Teaching students with learning disabilities to mindfully plan when writing. *Exceptional Children, 65*, 235-252.

Uebersax, J. S. "Likert Scales: Dispelling the Confusion." Statistical Methods for Rater Agreement. 31 Aug. 2006, 20 Nov. 2012 http://ourworld.compuserve.com/homepages/jsuebersax/likert.htm

Unrau, Norman. (2004). *Collaborating for literacy. Content area reading and writing: fostering literacies in middle and high school cultures*. New Jersey: Pearson. (pp. 310 – 344).

Urowitz, J. & Bozzato, E. (1992). Today's student is tomorrow's citizen. *Viewpoint: Teaching Guides, 52,* 1-14.

U.S. Department of Education. (2013). *Proven methods: Questions and answers on No Child left Behind.* Washington, DC: Author. Retrieved October 29, 2013, from http://www.ed.gov/nclb/methods/whatworks/doing.html.

U.S. Department of Education (2003). National assessment of educational progress. The nation's report card. Washington, D.C.: Institute of Education Sciences (NCES 2004-451/452).

Viau, E. A. (1998 a). Color me a writer: Teaching students to think critically. *Learning & Leading With Technology, 25*(5), 17-20.

Viau, E. A. (1998 b). Shades of meaning: Using color to enhance reading. *Journal of Adolescent & Adult Literacy, 41*(6), 476-477.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1962 a). *The Collected Works of L. S. Vygotsky* (Vol. 1). In R. W. Rieber and A. S. Carton (Eds), Plenum Press, New York and London.

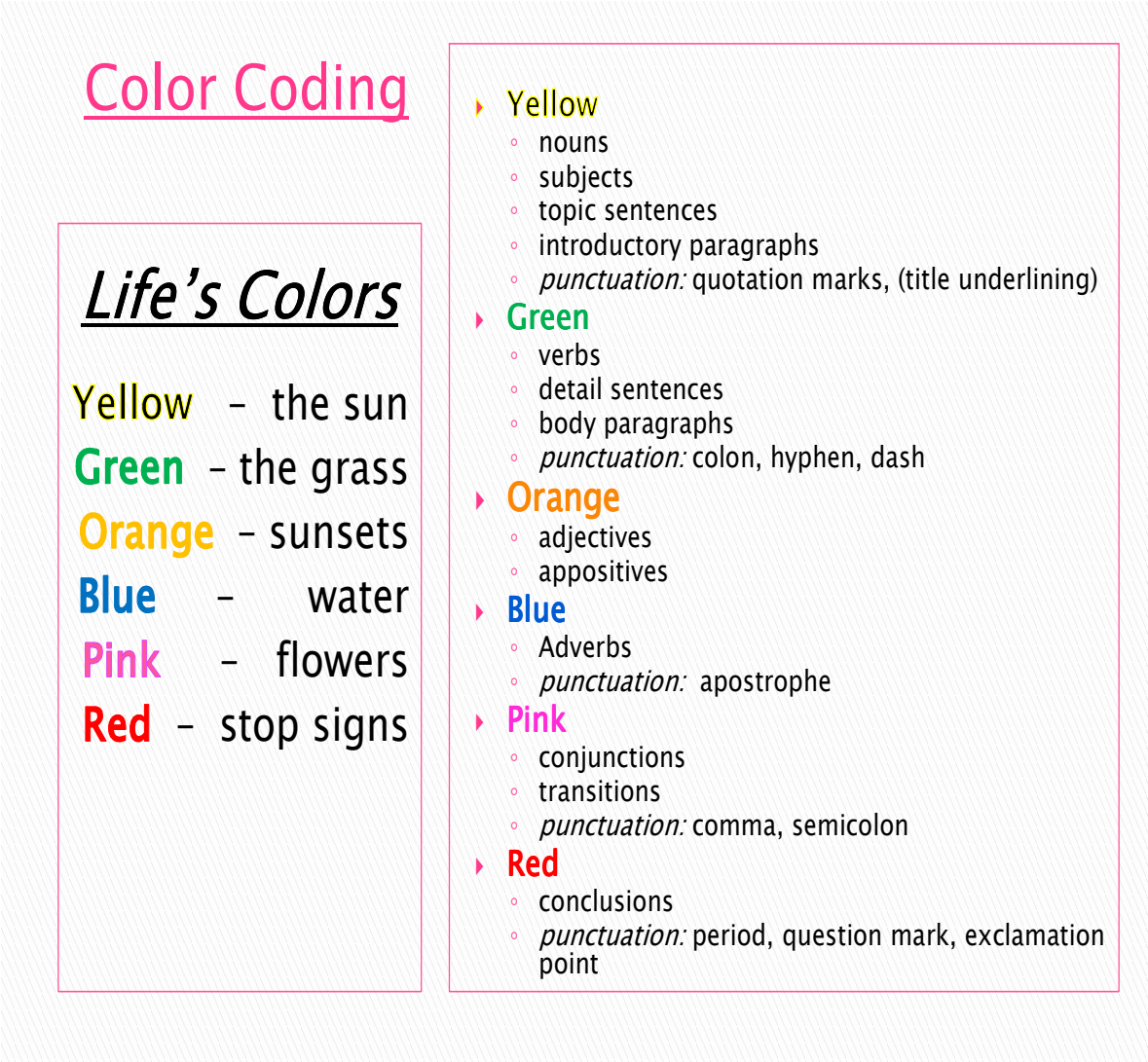
Vygotsky, L. S. (1962 b). *Thought and Language*. MIT Press, Massachusetts Institute of Technology and John Wiley and Sons.

Writers Inc. Daily Language Workouts: Level 11. (2001). Wilmington, MA: Great Source: Write Source, Houghton Mifflin Co.

Zeki, S. (1999). *Inner vision: An exploration of art and the brain*. Oxford, England. Oxford University Press.

APPENDICES

Appendix A. Color-Code Scheme



Appendix B. Writing Instruction Lesson Plans

NOTICE: highlighted segments were added for experimental groups only

Sentence Structure and Variety Lesson

English Composition (*for 12 students, but it may be adapted for larger class sizes)*

Rationale:

To fully appreciate and understand the manipulation of sentence variety to more fully describe and relay information to the reader. Fluency in sentence variety and structure will enhance the students' written expression skills whether writing a single paragraph or a full size essay and whether it be fictional creative writing or non-fictional research.

Purpose:

To enhance the students' awareness and understanding of correctly arranging phrases and clauses to form various types of sentences. This awareness will enable them to enhance their written expression skills to better communicate on an advanced written level.

Materials:

- Laminated numbers (two sets of # 's 1-6) - *6 groups of student partners*
- *V*arious transparency flash cards of phrases and clauses
- Laminated and colored conjunction and punctuation flash cards
- Pencil and Paper

Intelligences:

- Linguistic / Logical – reading and sorting through various phrases and clauses
- Visual / Spatial – sorting of flashcards with color organization
- Bodily / Kinesthetic – manipulating of the transparency and color flash card sets
- Intrapersonal – thought processing skills to create and develop fluent sentences through color-coded patterning
- Interpersonal – peer interaction with sorting various color-coded sentence writing tasks

Overt Objectives: *(Measurable skills seen with our eyes)*

Students will be able to: Organize phrase and clause flash cards into sentences
Students will be able to: Use proper conjunctions when creating sentences
Students will be able to: Use proper punctuation when creating sentences
Students will be able to: Change and adapt simple sentences to create a variety of sentence types

Covert Objectives: *(Immeasurable skills not seen with our eyes)*
Students will be able to: Enhance listening and communication skills
Students will be able to: Practice thought processing skills with sentence manipulation
Students will be able to: Realize sentence fluency

Behavioral Objectives:
Students will be able to: Discuss and listen courteously
Students will be able to: Share opinions without inappropriate criticism
Students will be able to: Work collaboratively and share responsibilities in a well mannered fashion

Procedures:

1. *Class Starter:* Hand each student a laminated number as they enter the classroom and direct them to the proper student partner according to their laminated number card
2. *Role Modeling*: Begin by organizing word flash cards into a sentence then use phrase flash cards to arrange into a sentence then clause flash cards to arrange into a sentence…change the sentence types (use colored flash cards)
3. Pass out the color-coded word, phrases, and clauses transparency flash cards
4. Pass out the laminated colored conjunction and punctuation cards
5. Peer groups work collaboratively to form various sentences by manipulating the transparencies with the colored conjunction and punctuation flashcards
6. Allow the groups to work forming various sentence types (10-15 minutes to form one sentence type)
7. Circulate through the room to check student progress – guide further organization of the color-coded flashcards
8. Encourage students form 3 sentences of each type at their desks with their partners
9. Have students take turns placing their transparency sentences (1 from each type) on the overhead projector for the class to view and discuss
10. Allow the class to discuss the patterns they see and discover the formulas for each sentence type
11. Have students write in their notebooks these deduced sentence patterns / formulas (emerged patterns from the color-coded positions)
12. Have students write the various sentence formulas in their notebooks
13. Have students make a notation of the various forms of conjunction use (emerged patterns from the various color-coded positions)

Assessment:

Pass the Can of Knowledge technique

1. The first student asks a question from the can to read and selects another student to answer the question (about sentence structure)
2. Once the 2nd student answers the question correctly they may select a 3rd student to ask a question from the can (If they answer incorrectly they select a 3rd student to help them who then selects a 4th student)
3. Have the 3rd (or 4th) student pick a question from the can to read to the class and then select another student to answer
4. Continue this process until all students in the class have answered a question
    a. This allows the teacher immediate assessment of the student's sentence structure and variety understanding
    b. Questions can follow the color-code by being printed on colored paper
    c. Students may answer based upon color-coding

Individual assessment for grading

1. Decipher and highlight in the appropriate color, and find the correct formula for various sentences (worksheet or paragraphs)
    a. Teacher may grade these sheets for accurate highlighting and formulas
2. Each group will write various sentences to enhance their sentence fluency practice and awareness
3. Students may write a descriptive paragraph of choice utilizing the 4 types of sentences

Closure:

1. The assessments include much of our closure by repeating our objectives for students' verbal and written practice
2. The individual assessment will enhance in written form their true awareness and abilities to write sentences either singly or within a paragraph in a low stress manner

Paragraph Structure Lesson

English Composition (*for 12 students, but it may be adapted for larger class sizes)*

Rationale:

To fully appreciate and understand detail and transition organization within any particular type of paragraph, will allow the writer the ability to write concise, coherent, and sequentially-based paragraphs that will not only serve to entertain but to relay information, in a logical manner, to the reader. Paragraph fluency and structure will enhance the students' written expression skills whether writing a single paragraph or a full size essay and whether it be fiction or non-fiction.

Purpose:

To enhance the students' awareness and understanding of the importance of correctly organized paragraphs. This awareness will enable them to enhance their written expression skills and communicate with the world in the written form.

Materials:

- Laminated numbers (three sets of # 's 1-4) - *4 groups of 3 student partners*
- *V*arious laminated and colored sentence flash cards to form preset paragraphs
- Laminated and colored punctuation cards and transition cards
- Pencil and Paper

Intelligences:

- Linguistic / Logical – reading and sorting through various sentences
- Visual / Spatial – sorting and ordering of color-coded sentence flashcards
- Bodily / Kinesthetic – manipulating of the various sentences to form coherent paragraphs by following a color-coded schematic
- Intrapersonal – thought processing skills to solve the paragraph puzzle through represented and missing colors
- Interpersonal – peer interaction with color sorting and solving of the paragraph puzzle

Overt Objectives: *(Measurable skills seen with our eyes)*

Students will be able to: Organize sentence flash cards into a paragraph
Students will be able to: Use proper sentence transitions and sentence order
Students will be able to: Use proper sentence punctuation and sentence order
Students will be able to: Sort various sentence types to create a paragraph story

Covert Objectives: *(Immeasurable skills not seen with our eyes)*

Students will be able to: Enhance listening and communication skills
Students will be able to: Practice thought processing skills with sentence organization

Students will be able to: Practice elaborating ideas and opinions
Students will be able to: Realize paragraph structure through transitions

Behavioral Objectives:
Students will be able to: Discuss and listen courteously
Students will be able to: Share opinions without inappropriate criticism
Students will be able to: Work collaboratively and share responsibilities in a well mannered fashion

Procedures:

1. *Class Starter:* Hand each student a laminated number as they enter the classroom and direct them to the proper student group according to their laminated number card
2. *Role Modeling*: Begin by organizing a story on the overhead projector with the use of sentence flash cards (use color-coded sentence segments)
3. *2 Types:* 2 stories passive and active (2 separate days)
4. Pass out the color-coded story sentence flash cards
5. Pass out the laminated and colored transition cards
6. Pass out the laminated and colored punctuation cards
7. Peer groups work collaboratively to form a paragraph story
8. 1st paragraph with transitions included into sentence cards (in color for more visual support)
9. 2nd story without transitions included – students use the colored transition flash cards
10. Allow groups to work and manipulate color-coded sentence and punctuation flashcards to form a story (20-30 minutes)
11. Circulate through the room to check student progress – guide further organization of the flashcards
12. Have students form the story at their desks with their partners
13. Have students take turns requesting help from other group if need be (sharing of ideas)
14. Encourage each group read their story aloud to the class
15. Allow the class to discuss the transition patterns and paragraph organization they see (patterns emerge based upon color-code schematic)
16. Have students write in their notebooks these deduced paragraph discoveries (or any emerged color patterns)
17. Allow students to read the teacher organized story from the overhead projector to analyze and compare to their group story
18. Have students make a notation of any similarities and differences

Assessment:

Pass the Can of Knowledge technique

1. The first student asks a question from the can to read and selects another student to answer the question (about paragraph organization)
2. Once the 2nd student answers the question correctly they may select a 3rd student to ask a question from the can
    a. If they answer incorrectly they select a 3rd student to help them who then selects a 4th student
3. Have the 3rd (or 4th) student pick a question from the can to read to the class and then select another student to answer
4. Continue this process until all students in the class have answered a question
    a. This allows the teacher immediate assessment of the student's paragraph understanding
    b. Questions can follow the color-code by being printed on colored paper
    c. Students may answer based upon color-coding

Individual assessment for grading

1. Each group will write a 2nd story from different color-coded flashcards to enhance paragraph fluency & awareness
2. Teacher may grade this paragraph story for proper transition use and organization
3. Students may write a low stress descriptive or narrative paragraph of choice utilizing the 4 types of sentences and proper paragraph organization of details
4. Students may highlight the paragraph for sentence structure and paragraph organization

Closure:

1. The assessments include much of our closure by repeating our objectives for students' verbal and written practice
2. The individual assessment will enhance in written form their true awareness and abilities to write a paragraph utilizing proper transitions and sentence structure in a step by step process
3. The students will use higher critical thinking skills by deducing sentence sequences to form a story

Library Reference Search Lesson

English Composition (*for 12 students, but it may be adapted for larger class sizes)*

Rationale:

To fully appreciate and understand the logistics of the Library contents for research purposes of acquiring information with a hands on manipulation of several different sources of information available thus enhancing the students' understanding of research techniques.

Purpose:

To enhance the students' awareness and understanding of correctly searching through the library for research materials. The students will hopefully learn methods of library research and how to interpret research materials.

Materials:

- Laminated numbers (two sets of # 's 1-6) - *6 groups of 12 student partners*
- *V*arious references for comparison of related information within a bibliography and of the type of information contained within each differing type
- Reference Scavenger Hunt worksheet
- Questions in a can of locating specific materials in the library
- Pencil and Paper

Intelligences:

- Linguistic / Logical – reading and interpreting research databases
- Visual / Spatial – location of research databases
- Bodily / Kinesthetic – circulating through the library
- Intra personal – judgment, seek, and search skills
- Interpersonal - peer interaction with individual tasks

Overt Objectives: *(Measurable skills seen with our eyes)*

Students will be able to: Locate stipulated reference sources
Students will be able to: Classify particular reference sources
Students will be able to: Organize located reference information into categories

Covert Objectives: *(Immeasurable skills not seen with our eyes)*

Students will be able to: Enhance listening, communication, and inquiry skills
Students will be able to: Practice library search skills of desired materials
Students will be able to: Develop awareness of library organization of materials
Students will be able to: Realize what the Library has to offer

Behavioral Objectives:

Students will be able to: Listen courteously to Librarian Instruction
Students will be able to: Respectfully search for desired informational materials
Students will be able to: Work collaboratively and share responsibilities in a well mannered fashion

Procedures:

1. ***Class Starter:*** Hand each student a laminated number as they enter the classroom and direct them to the proper student partner according to their laminated number card
2. Pass out the scavenger hunt worksheets (1 per partner group) to be handed in at end of class period
3. Go to the Library for research instruction by librarians
4. ***Librarians will explain the different types of materials to be found in the library, the research techniques, and the basic floor plan of the school library***
5. Discuss as a class any questions or concerns on desired types of materials
6. Have students write in their notebooks the brief layout guidelines to finding materials
7. Release students to search for the required materials on the scavenger hunt worksheet
8. Circulate through the library to guide and help the students in their quest
9. Have students turn in the Scavenger Hunt worksheets before returning to the classroom
10. Class discussion: compare and contrast the information types and sources found in their library quest
11. Have students note in their notebooks their material findings and types of informative materials

Assessment:

Pass the Can of Knowledge technique

1. The first student asks a question from the can to read and selects another student to answer the question (about library sources and information)
2. Once the 2nd student answers the question correctly they may select a 3rd student to ask a question from the can
    a. If they answer incorrectly they select a 3rd student to help them who then selects a 4th student
3. Have the 3rd (or 4th) student pick a question from the can to read to the class and then select another student to answer
4. Continue this process until all students in the class have answered a question
    a. This allows the teacher immediate assessment of the student's library materials understanding

Individual assessment for grading

1. Each group will answer questions on a reference location worksheet (Scavenger Hunt worksheet)
    a. **Teacher may grade this answer sheet as a partner grade**
2. Library Search and Location of Materials Quiz may be given for an assessment (quiz) grade

Closure:

1. The assessments include much of our closure by repeating our objectives for students' verbal and written practice
2. The individual assessment will enhance in a visual manner their true awareness and abilities to locating reference materials in the library in a non-stressful and light-hearted manner

Documentation of References Lesson

English Composition (*for 12 students, but it may be adapted for larger class sizes)*

Rationale:

To fully appreciate and understand the logistics of the MLA (or other preferred style) documentation style of references for research purposes of acquiring information. This is a hands-on manipulation of several different flash cards representing different sources of information available to enhance the students' understanding of source documentation techniques in a more relatable manner.

Purpose:

To enhance the students' awareness and understanding of documentation patterns and logical organization of referenced facts from various research sources in the MLA style (as recommended by the Board of Ed for Secondary Education; or other preferred documentation style)

Materials:

- Laminated numbers (three sets of # 's 1-4) – 4 groups of 3 student partners
- 12 Laminated and colored reference citations (desk size) 3 per group and rotate through all
- Laminated and colored punctuation flash cards
- Documentation Guide Sheet for conferring of accurateness
- 12 Laminated and colored reference citations (larger size for the class to see on the board)
- Pencil and Paper

Intelligence:

- Linguistic / Logical – reading and comprehension of the documentation manual
- Bodily / Kinesthetic – colored documentation flash-card manipulative exploration
- Visual / Spatial – colored documentation flashcards
- Intrapersonal – critical thinking by interpreting the colored flashcards
- Interpersonal – group and class discussion of personal ideas from emerged color patterns

Overt Objectives: *(Measurable skills seen with our eyes)*

Students will be able to: Identify reference sources
Students will be able to: Recognize logical patterns of reference facts
Students will be able to: Classify information into reference groups
Students will be able to: Organize reference information into MLA documentation

Covert Objectives: (Immeasurable skills not seen with our eyes)
Students will be able to: Enhance listening and communication skills
Students will be able to: Practice elaborating ideas and opinions
Students will be able to: Practice thought processing skills with informational patterning
Students will be able to: Realize bibliography techniques

Behavioral Objectives:
Students will be able to: Discuss and listen courteously
Students will be able to: Share opinions without inappropriate criticism
Students will be able to: Work collaboratively and share responsibilities in a well mannered fashioned

Procedures:

1. *Class Starter:* Hand each student a laminated number as they enter the classroom and direct them to the proper student group according to their laminated number card
2. Pass out the cans of laminated citation color-coded flash cards
   (3 cans per group – 12 cans total)
3. Pass out the laminated and colored punctuation flash cards
4. Pass out the documentation question sheet for the students to fill in as they work on the cans (color prompting may be allowed)
5. Allow the groups to work on each can of colored documentation flashcards
   (5-10 minutes each can)
6. Circulate through the room to check student progress – guide further organization of the flashcards into a proper pattern
7. Allow students to view the answer guide sheet for checking accurateness
8. Allow the class to discuss any discovered patterns or themes in the citations of sources
   (use documentation question sheet)
9. Write class deduced guidelines to proper documentation on the board (noticed from emerged color patterns)
10. Have students write in their notebooks these deduced documentation guidelines
11. Read the Documentation Manual as a class - stopping to discuss various points
12. Pre-copied pages may be used for students to highlight
13. Discuss any similarities or differences in the manual to the class discoveries from the documentation flashcards (on the board)
14. Have students write in their notebooks the discussed similarities or differences (noticed from the emerged color patterns)

Assessment:

Pass the Citation technique

1. Have students one at a time arrange a laminated board size flashcard citation
2. Have 1st student choose a citation and arrange it upon the board then select a 2nd student
3. The 2nd student answers whether it is correct or not
    a. If incorrect, they may correct it and select a 3rd student
4. Have the 3rd student arrange a laminated board size flashcard citation and select a 4th student to decide its accurateness
5. Continue this process until all students have been to the board and all citations have been arranged
    a. This allows the teacher an immediate assessment of student documentation comprehension
    d. Board sixe flashcards can follow the color-code by being printed on colored paper or using color font
    b. Students may answer based upon color-coding

Individual assessment for grading

1. Each group will answer questions on a documentation worksheet using the documentation guide sheet and citation flashcard sets at their worktable (Teacher may grade this answer sheet as a group grade)
2. Documentation Manual Quiz may be given for an assessment (quiz) grade

Closure:

1. The assessments include much of our closure by repeating our objectives for students' verbal and written practice.
2. The individual assessment will enhance in a visual manner their true awareness and abilities when documenting information for research purposes
3. The students will use higher critical thinking skills by deducing documenting sequences

Paraphrasing Information for Note Cards Lesson

English Composition (*for 12 students, but it may be adapted for larger class sizes)*

Rationale:

To fully appreciate the simplicity of paraphrasing information from references onto note cards; organizing of information will aide student learning by classifying and categorizing vital detail information into pertinent facts that are less complicated and more relatable for students to see and organize for essay outlining.

Purpose:

To enhance the students' awareness and understanding of the value of paraphrasing for both note-taking and organization of new material thus avoiding plagiarism. The students' reading and understanding of research information to smaller detail bits will enhance the students' ability to lay out note card information in a manageable manner before committing to paper in an essay.

Materials:

- Various writings from various sources on transparencies for highlighting of detailed information
- Class set of paragraphs to analyze for detail information (same paragraph for all students)
- Colored Note Cards (yellow = subject, green = action, and pink = transitions)
- Highlighters (yellow = subject, green = action, orange/blue = descriptions, and pink = transitions)
- Pencil and Paper

Intelligence:

- Linguistic / Logical – reading and understanding of sample sentences and paragraphs
- Bodily / Kinesthetic – manipulating highlighted information onto colored coordinated note cards
- Visual / Spatial – decoding information by color
- Intrapersonal - critical thinking by interpreting the color enhanced information
- Interpersonal - class discussions of colored information deductions from paraphrasing to color coordinating note cards

Overt Objectives: *(Measurable skills seen with our eyes)*

Students will be able to: Identify and highlight key points of relative given information
Students will be able to: Separate and paraphrase information onto colored note card
Students will be able to: Classify/organize key detail information with transitions

Covert Objectives: (Immeasurable skills not seen with our eyes)
Students will be able to: Enhance listening and communication skills
Students will be able to: Practice reading skills both aloud and silently
Students will be able to: Develop organization skills
Students will be able to: Enhance paraphrasing and note taking skills

Behavioral Objectives:
Students will be able to: Sit quietly and attentively as others take their turn
Students will be able to: Discuss and share opinions without inappropriate criticism
Students will be able to: Maintain classroom propriety at they work independently
Students will be able to: Develop their critical thinking skills by analyzing the detail information
Students will be able to: Request assistance in a respectful & well-mannered fashion

Procedures:

1. View and discuss one paragraph transparency at a time for analysis
2. Allow class to openly analyze pertinent details in the paragraph while the teacher highlights the pertinent information on the overhead
3. Write the highlighted details in a sentence that still pertain to the paragraph
4. This demonstrates 2 purposes: the importance of the 2 colors and how they relate to each other
5. Pass out desired paragraphs for class highlighting and paraphrasing
6. Have 1st student read a sentence aloud
7. Have 2nd student decide whether any information should be declared as a detail fact for the essay and should be highlighted or not
8. Have 3rd student read the next sentence aloud
9. Have 4th student decide whether any information should be declared as a detail fact and should be highlighted or not
10. Continue this process until the entire paragraph has been read and highlighted
11. Have class discuss any patterns or logical sequencing they notice via the colors
12. Have students write details onto note cards using the highlighted information
13. Remember to use the same color note card for each piece of highlighted information
14. Encourage students to read their sentences aloud
15. As a class discuss the similarities and differences of the sentences and highlights
16. Have students organize note cards into possible detail sentence organization
17. Have students fill detail information into a paragraph idea map
18. Have students write a paragraph using the paragraph idea map information
19. Encourage each student to write their paragraphs on the board for class reflection
20. Have students begin this process again with a fresh and different paragraph

Assessment:

Pass the Marker technique

1. Have students one at a time work with mini-paragraphs from the box of transparency paragraphs
2. Have the 1st student pick a mini-paragraph from the box and place it on the overhead projector to read aloud to the class then select 2nd student
3. Have the 2nd student report and highlight the relevant information then select a 3rd student
4. Have the 3rd student write an accurate detailed sentence using the highlighted information only then select a 4th student
5. Have the 4th student select another mini-paragraph from the sentence box to read aloud
6. Continue this process until all students have written a sentence on the overhead
7. This allows the teacher an immediate assessment of student abilities to paraphrase and write a detailed sentence using only relevant detail facts of information that are highlighted and correspond to a particular colored note card

Individual assessment for grading

1. Each student will read and highlight a short paragraph for relevant information and write a short summary
2. Documentation Manual (Paraphrasing section) Quiz may be given for an assessment (quiz) grade

Closure:

1. Assessments include much of closure by repeating objectives for students' verbal and written practice
2. The individual assessment will enhance in a visual manner their true awareness and abilities when paraphrasing information for note cards to write clear sentences with plagiarism
3. Through this process students will learn to relate information to their own ideas without plagiarism
4. The students will use higher critical thinking skills by deducing pertinent detail information

Writing a Research Paper Lesson

English Composition

Rationale:

To fully appreciate the familiarity and ease of research essay writing with guided steps and organization of information into a color coded note card format with colored coded Venn Diagrams and Brainstorming maps. This will aide student learning allowing them to see more than just a vast amount of words, but instead they will see sections of information in a more visually sequentially manageable manner.

Purpose:

To enhance the students' awareness and fluency when utilizing various strategies to pull together a research paper.

Materials:

- Various research topics
- Time in the library as a class & Student login codes for library computer access
- Highlighters (yellow = subject and green = action)
- Colored note cards & Laminated and colored Transition and Conjunction cards
- Various color-coded Venn Diagrams and Brainstorming Maps and Paragraph Outline Maps
- Pencil and Paper

Intelligences:

- Linguistic / Logical – reading and interpreting research databases and found information
- Bodily / Kinesthetic – locations of reference databases
- Visual / Spatial – colored note cards of information
- Intrapersonal – self awareness and curiosity when researching topics to write about
- Interpersonal – teacher & peer interaction within the library
- ***Any of the 8 Intelligences*** – creative enrichment project to depict the research topic

Overt Objectives: *(Measurable skills seen with our eyes)*

Students will be able to: Locate given information in the library
Students will be able to: Recognize useful information from a given reference source
Students will be able to: Organize information into separate, categorized topics and details
Students will be able to: Write a variety of sentences with properly transitioned detail information
Students will be able to: Document pertinent research information and materials used within the essay

Covert Objectives: (Immeasurable skills not seen with our eyes)

Students will be able to: Enhance their listening & communication skills
Students will be able to: Develop reading and comprehension skills
Students will be able to: Practice Library research skills
Students will be able to: Develop Documentation awareness of research materials

Behavioral Objectives:

Students will be able to: Behave quietly and attentively in the library
Students will be able to: Locate and copy pertinent information from reference books
Students will be able to: Write an original research essay without plagiarism

Procedures:

1. Place the topic list on the overhead projector for the students to read and discern their topic of interest
2. Make a note of the topic each student chooses (1 per student – all differing)
3. Take students to the library
4. Allow class to walk through the library in search of the topic information
5. Have students search the Internet through Google for research information on chosen topic
6. Have students print desired pages of information from the computer
7. Have students photocopy desired pages of information from reference books
8. Walk through and guide the students in their quest of information
9. Return to the class with print-outs and photocopies
   (This may take 2 trips to the library)
10. In the classroom, have students find and highlight their desired information from their print-outs and photocopies (yellow = subject ideas and green = action ideas and orange/blue for added descriptions)
    These highlights lead to paraphrasing of information
11. Transfer the information onto colored note cards – 1 piece of information per card (colors must match the facts)

12. Use Venn Diagrams for organizing and classifying details (comparison/contrast, problem/solution, etc)
13. Write any transition / connection ideas onto color-coded note cards
14. Have students write the bibliographic information on the backside of the note card
15. After all note cards are written have students arrange them on their desk in an organized fashion
16. Have students review their transition sheets to write any needed transitions onto color-coded note cards and arrange them within Essay maps / outlines
17. Take a class period (or more as needed) to type the rough draft of the research paper onto the computer – double spaced for adding information when revising
18. Have student choose a different partner to collaborate on their essays – REVISE and EDIT
19. Each partner must read and analyze the essay for needed changes – follow a Rubric
20. Students will add with colored gel pens any missing aesthetic information to bring more fluency to their papers

Assessment:

Partner Instruction Support technique

1. Have students partner up to help each other arrange their color-coded note cards and color-coded transitions if necessary
2. Have students partner up to proofread and peer edit each other's essays if desired

Individual assessment for grading

1. Colored note cards may be checked daily for relevant information
2. Rough draft may be checked periodically for proper topic organization and sentence structure
3. Final 5 paragraph minimum Research Paper and Bibliography

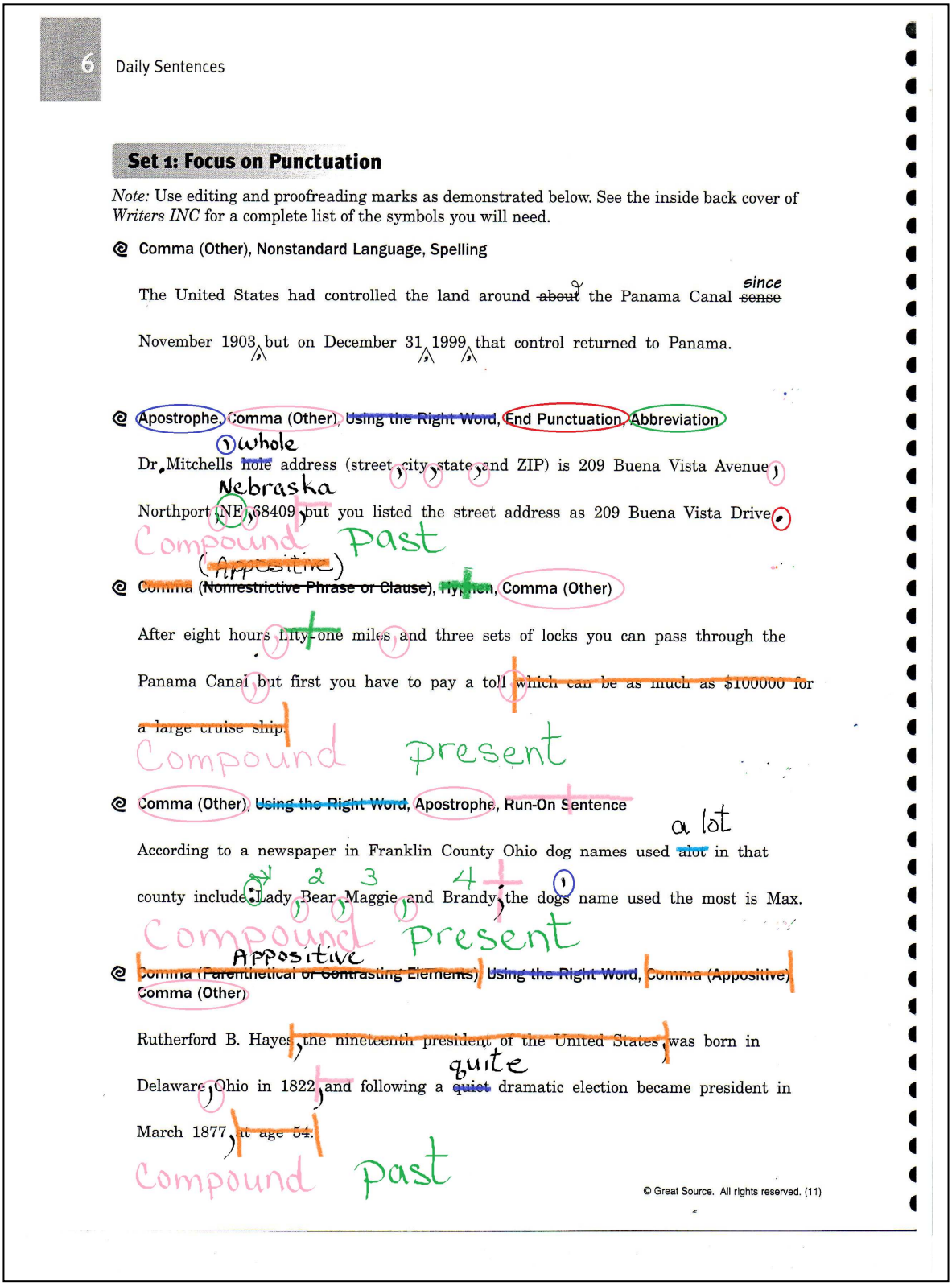
Closure:

1. The assessments include much of our closure by repeating our objectives for students' verbal and written practice.
2. The individual assessment will enhance in a visual manner their true ability to complete various tasks and skills required for a final written documented paper
3. ***Enrichment project to follow:*** A creative project to depict their chosen essay topic

Appendix C. Daily Oral Language (DOL) Color-Code Scheme

Color-Code Scheme for DOL Proofreading/Editing	
Color Symbol Name	**Proofreading/Editing Name**
Yellow Highlight	Subject Verb Agreement
Yellow Circle	Pronoun Antecedent
Yellow Underline	Title
Pencil Initials	Spelling
Pencil Circle	Nonstandard Language
Pink Circle	Comma Other
Orange Highlight with vertical sides & arrow	Comma Appositive
Orange Highlight with vertical sides	Comma Nonrestrictive Phrase or Clause
Green Plus Sign	Hyphen
Green Circle/Arrow	Colon
Green Circle	Abbreviation
Blue Circle	Apostrophe
Blue Circle/Arrow	Numbers
Blue Highlight	Using the Right Word

Appendix D. Sample Daily Oral Language (DOL) with Color



6 Daily Sentences

Set 1: Focus on Punctuation

Note: Use editing and proofreading marks as demonstrated below. See the inside back cover of *Writers INC* for a complete list of the symbols you will need.

Comma (Other), Nonstandard Language, Spelling

The United States had controlled the land around ~~about~~ the Panama Canal ~~sense~~ since November 1903, but on December 31, 1999, that control returned to Panama.

~~Apostrophe~~, Comma (Other), ~~Using the Right Word~~, ~~End Punctuation~~, ~~Abbreviation~~

Dr. Mitchells hole address (street, city, state, and ZIP) is 209 Buena Vista Avenue, Northport, NE, 68409, but you listed the street address as 209 Buena Vista Drive.

~~Comma (Nonrestrictive Phrase or Clause)~~, ~~Hyphen~~, Comma (Other)

After eight hours fifty-one miles, and three sets of locks you can pass through the Panama Canal but first you have to pay a toll which can be as much as $100000 for a large cruise ship.

Comma (Other), ~~Using the Right Word~~, Apostrophe, Run-On Sentence

According to a newspaper in Franklin County Ohio dog names used ~~alot~~ a lot in that county include Lady, Bear, Maggie, and Brandy, the dogs name used the most is Max.

~~Comma (Parenthetical or Contrasting Elements)~~, ~~Using the Right Word~~, Comma (Appositive), Comma (Other)

Rutherford B. Hayes, the nineteenth president of the United States, was born in Delaware, Ohio in 1822, and following a ~~quiet~~ quite dramatic election became president in March 1877, ~~at age 54~~.

Appendix E. Experimental Group Participant Survey

Writing with Color Affect on Students' Comprehension of Writing Components

Investigator: **Claudia C. Otto, OSU Doctoral Candidate**

PART I

Rate your perceptions on the following questions based upon a Likert Scale of 1–5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I liked the 6 colors chosen	1	2	3	4	5
The 6 colors tied to nature were helpful	1	2	3	4	5
Using colors made the text easier to read	1	2	3	4	5
Highlighting the text with different colors helped me to separate the information by topics	1	2	3	4	5
Using colors helped me see different structures within the written information	1	2	3	4	5
The colors helped me recognize writing composition elements within individual paragraphs	1	2	3	4	5
The colors helped me identify various writing elements and details within sentences	1	2	3	4	5
The color code helped me to write better sentences	1	2	3	4	5
The color code helped me to write better paragraphs	1	2	3	4	5
The color code helped me to write better essays	1	2	3	4	5
The color code helped me to revise my writing	1	2	3	4	5
I believe using colors improved my lessons	1	2	3	4	5
I believe using colors improved my grades in the class	1	2	3	4	5
I enjoyed learning the color code	1	2	3	4	5

PART II

Please answer the following questions.

---

1. What was your favorite part of the color coding?

2. What was your least favorite part of the color coding?

3. Would you like to continue learning your English lessons using color?

4. Will you continue to use the color coding when writing and revising essays?

5. Do you think color coding would help you learn the material in other courses?

Appendix F. Class Instruction Details

Phase 1: TOWL-4 Pre-Testing (14 school days)

Phase 2: Class Instruction

The color-coding strategy was implemented with the experimental group with the teacher/researcher explaining the color-coding strategy, modeling the use of the color-coding strategy, providing guidance during class work, and supervising students during independent work times. A detailed summary of the color-coding schematic is found in Appendix A. The experimental group classes received two class sessions on the color-coding method that included verbal explanations and modeling of the learning content with the embedded the color-code. During this same time frame, the control group classes were given independent study time rather than receiving English instruction and lessons in order to keep all five English classes on the same curriculum schedule and receive the same instructional time, maintaining an equitable imparting of English content material. The color-coding strategy was implemented (in the experimental classes only) during assigned class times and in concurrence with English class content material, as the two semesters (fall and spring) progressed.

In both the control and experimental groups, teaching began with the presentation of assorted grammar writing terms and rules, editing and proofreading vernacular and routines, and publishing procedures. Unit composition instruction focused first on the presentation of various lesson sets of specific composition writing content pertinent to the improvement and advancement of writing skills (e.g. the parts of speech, sentence types, paragraph segments, essay structure, and research divisions). The detailed lesson plans

for sentence and paragraph structure, library reference search, documentation of references, paraphrasing information, and writing a research paper are all found in Appendix B. Literature lessons were integrated at various times throughout the semester not only to introduce literary terms and promote practice of their particular individual and complementary use but also to support and reinforce current unit composition lessons.

The literature curriculum for both the 10th and 11th grade levels mandated the study of particular literary terms and their use within written compositions and documents as well as the reading, discussion, and analysis of poetry, short stories, and a particular novel. The application of the color-coding strategy was implemented with all literature lessons except the novel. All literature lessons, except the novel, were instructed with a dual focus, the primary focus targeting literary analysis and the secondary focus targeting written composition analysis of writing techniques, grammar, and mechanics. Since the application of the color-coding strategy to the analysis of a novel would not be implemented and was not a focus of this research study, the teacher/researcher purposely planned for this particular instructional portion of the English curriculum guide to be implemented at the end of the school year rather than its typically planned timeframe of mid-year.

English lessons, composition and literature, were in alignment with Pass Skill standards as well as Common Core practice of 80% non-fiction and 20% fiction writing application. Although the focus of these writing and literature lessons were within the domain of the 10th and 11th grade English writing curriculums, the specific objective of these particular lessons was to develop skills which would assist students in the production of well organized essays. An assortment of class practice exercises, lesson

packets, content specific projects, and assessments (both quizzes and examinations) reinforcing the instructional range of pre-determined curriculum content to be imparted and benchmark targets depicting content mastery were addressed and assigned at various intervals throughout the two semester school year. The major parts of appropriate sentence structure that the students were required to learn were as follows: subject, noun, pronoun, verb, adjective, adverb, preposition, infinitive, interjection, conjunction, phrase, clause, and punctuation (apostrophe, hyphen, colon, comma, semicolon, and end punctuation). The major divisions and subdivisions of appropriate sentence structure that the students were required to learn were as follows: simple, compound, complex, and compound-complex as well declarative, imperative, exclamatory, and interrogative sentences. The major divisions and subdivisions representative of a well structured and organized essay that the students were required to learn are listed in the following table.

Table F1
Curriculum Standards for the Main Parts of an Essay

Three Main Parts of an Essay		
Beginning: Introduction Paragraph	Middle: Body Paragraphs	Ending: Conclusion Paragraph
<u>Purpose</u> Introduction of the main idea of the essay Catch readers attention Set the tone of the paper Begin with general remarks to stimulate interest Present background information, closing in on the topic with specificity Present a thesis statement	<u>Purpose</u> The central portion of the essay Contains supporting information Subtopics are discussed One subtopic per body paragraph	<u>Purpose</u> Brings the essay to a close Remind the reader of the main idea Wraps up all the ideas in the essay Repeat and reword the thesis sentence Include final remarks to unify the essay Help the reader understand and appreciate the essay
<u>Sentence Types</u> Topic Statement (1st sentence) Descriptive: Tells the reader that a specific person place or thing will be described Narrative: Introduces a story to be told Persuasive: Introduces the side and reason of the issue to be supported Expository: Provides the reader information about a particular fact Thesis Statement (last sentence) A controlling idea that ties the essay together A single well focused sentence Indicates the essay's subtopics	<u>Sentence Types</u> Detail Sentences Provides information for each of the subtopics Support with relevant examples, details, facts, or reasons in support of the thesis statement	<u>Sentence Types</u> Clincher Statement (last sentence) Presents a forceful, eloquent, or witty ending
Transitions between ideas	Transitions between detail paragraphs	Repeated Transitions
	Transitions between the facts, details, and explanations in each paragraph	
Point View (1st , 2nd, and 3rd) Tense (past, present, future) Appropriate Punctuation		

Visual stimuli in the form of a color-coding that was aligned with particular grammar parts and structures and essay divisions and subdivisions were provided to the experimental groups. Six colors were used to represent various subdivisions of the writing segments and processes, helping the students focus on particular individualized tasks. Again, the material covered in class and assigned to the students remained the same per grade level and class within that grade level. However, students in the experimental groups were asked to provide a generalization, principle, or theme from the patterns that emerged because they were more readily able to see the patterns with the color-coding system while students in the control groups were simply told the grammar writing principle. These visual, nonlinguistic representations helped the students in the experimental groups recognize how related topics connected by seeing a logical organization of information. Consequently, a developed and implemented color-coding of concepts enabled these students to work from their specific areas of strength.

The color-coding enhancement was added to the content materials by students with highlighters and gel pens, guided and supervised by the teacher/researcher. During the fall semester, the teacher/researcher modeled, for the experimental groups, the highlighting and color writing techniques every day during the lessons presented. Modeling of color-code application took place on the computer activated Promethean Board while 10th grade students followed along on their school assigned netbook computers and 11th grade students followed along on hard copies (this grade level was not issued personal netbooks). During the second semester, the teacher/researcher no longer modeled the color-coding on the board, but instead the students each took turns at the Promethean Board to model the color-coding for the class. Classroom instruction of

all lessons were taught utilizing Marzano's (2005, 2001) Classroom Instruction That Works methodology incorporating his nine research-based teaching strategies. Also, the composition lessons were based upon the SIMs Learning Strategies curriculum (Schumaker, et al., 1999; & Deshler & Schumaker, 1988) following the SIMs writing strategies that are based upon the premise of a formulaic writing process.

Every day, each class period began with the 'Daily Oral Language' (DOL) consisting of five sentences in need of correction or a 10-line typed paragraph necessitating proofreading and revision. The sentences were given during the first semester and the paragraphs were given during the second semester. This DOL lesson consisted of students' independent attempt to correct the sentences during an allotted 5 minute time period before the teacher/researcher would explain and correct the sentences one at a time on the Promethean Board, with student input and taking approximately 10 minutes. Students were instructed to follow along with the teacher/researcher. In the experimental groups, the teacher/researcher would add designated colors to the particular corrections in order to make the corrections more visible which enhanced the visibility of emerging patterns. This addition of color meant that the DOL instructional time frame would be approximately 5-10 minutes longer than the timeframe allotted for the control groups. So, these classes, the control groups, usually completed their instructional class work before the bell rang indicating the change of class periods. In order that all class periods (control and experimental) remain on the same instructional time frame, no further instruction was given to fill the time until the school bell; instead, the students typically sat and visited quietly until the bell rang. The color-coding schema for the DOL corrections can be found in Appendix C, and a sample color-coded DOL can be found in

Appendix D. The DOL worksheets were assessed based upon revisions made and not the added color-coding. New content and reinforcement lessons, as stipulated by the school curriculum, followed for the remaining 30 to 40 minutes of the class period.

On Mondays and Fridays, after the DOL, vocabulary was introduced, discussed, and assessed. Each grade level had a different vocabulary list. Sophomores studied literary terms and vocabulary semantics. Typically five or six words were assigned each week. Juniors studied the academic vocabulary list that was encouraged by the Oklahoma State Department of Education. This list was retrieved in May of 2012 from state department's website under the high school language arts section. Because the students in the special education English classes were performing well-below grade level, the words selected were chosen from several lists incorporating various grade levels (5^{th} through 11^{th}), creating a list that would ensure success at their performance level yet challenge them at their grade level. Typically, six words were assigned per week. On Mondays, students worked on their vocabulary graphic organizers, depicting the vocabulary word's definition, synonym, antonym, its use within a sentence, and/or purpose in well organized and structured writing. On Fridays, students were assessed on their vocabulary terms. The experimental groups were instructed to color-code the vocabulary terms in accordance with the color-coding schema for writing sentences, as depicted in Appendix A. Also on Fridays, per the high school mandate in accordance with common core standards, a non-fiction writing task was assigned. Teachers were asked to incorporate short non-fiction writing tasks weekly into their curriculum and turn in student samples of the non-fiction writing by Friday afternoon. During the first semester, students in the experimental groups were assigned a different color each week

to use on their non-fiction writing, if class time permitted, in order to continue practicing with the color-code enhancement. As the semester progressed, students were asked to add another color each month and so forth. During the second month of the second semester, students were color-coding the entire non-fiction writing sample with all 6 colors.

On Tuesdays, Wednesdays, and Thursdays, content lesson instruction was given in accordance with the designated English curriculum. Each grade level received writing curriculum instruction; instruction that would help students to understand individual aspects of the writing process and improve writing skills. The foundational premise of the instruction was the same but differed in complexity with the two grade levels. Literature lessons were incorporated once a month and used to not only stress particular literature content but as reinforcement for the writing process because each literature lesson was broken down into its individual writing aspects and analyzed for its individual parts and as a whole within one written document.

The curriculum instruction began with the foundational, Parts of Speech lessons. These lessons were taught during the month of September. Students were instructed upon the individual parts of speech using worksheets, in-class manipulatives, and sample sentences and paragraphs for analysis. The mandatory high school English department-approved English curriculum-based assessment for the Parts of Speech was given to all students as a pre-test during the fourteen school days of testing at the beginning of the school year but was not assessed. The same assessment was given again as a post-test once the instructional unit was complete. After the post-test was administered to the class as a whole both the pre- and post-tests were scored. Only the post-test was used for

grading purposes. The same instructional presentation and procedures were applied for the Punctuation lessons that were introduced for the Parts of Speech lessons. These two lesson units were introduced first as they are foundational to the writing process. Comparison of the pre- and post-tests for both lesson units (Parts of Speech and Punctuation) were analyzed by the teacher/researcher in order to gauge students' processing and comprehension of the color-code scheme and to analyze the early effects of the color-coding enhancement (comparing control and experimental groups' test scores).

The writing lessons that followed were: Sentence Structure, Paragraph Structure, Library Reference Search, Documentation of References, Paraphrasing of Information, and Writing a Research Paper. Sample lesson plans for these lessons can be found in Appendix B. These lessons were taught to the control and experimental groups using both lecture and manipulative formats; students were expected to not only regurgitate the information verbatim but also elaborate upon the content ideas during question and answer discussion periods. In all classes, students were asked to analyze the presented content and speculate potential grammar rules and principles regarding the written text and structure. Students in the control groups could not satisfactorily infer any rules or principles from the presented material, and instead had to be told the grammar rules and principles pertinent to the written text and structure. Students in the experimental groups, however, could deduce various grammar rules and principles because the color-coding enhancement allowed for students to visualize emerging patterns to which they were able to designate grammar rules and principles instead of being told the rules and principles.

The color-coding enhancement was used for each lesson on not only hard copies passed out to the students but also on the manipulatives used throughout the lessons.

Sentence Proficiency lessons began in October following the SIMs strategy for creating the four types of sentences (simple, compound, complex, and compound-complex). Worksheets and various paragraphs found in common reading materials (magazines, newspapers, Disney storybooks, and excerpts from classic literature) were used to build sentence skills through revision, analysis, and reconstruction. The experimental groups were required to color the various parts of the sentences; color-coding was added to the formulaic representation of each sentence type, as depicted by the SIMs writing strategy (Deshler & Schumaker, 2006, 1988; & Schumaker et al., 1999). First, students followed along with the teacher/researcher by simply copying the colors used. Second, students were asked to find emerging patterns via the matching colors. Third, students were asked to designate generalized rules explaining the found patterns. Formulaic rules and formulas were discovered regarding the four sentence types. Fourth, students were given various paragraphs to highlight the various sentences within each paragraph, using the color-code enhancement. As students became more proficient in labeling the different sentence types and finding the different sentence components, lessons moved from searching for various components to adding various components to already existing sentences. Experimental group students used highlighters to find various sentence components and color gel pens to add various sentence components. The control groups used no color.

The teacher/researcher continued in November and December with Paragraph Proficiency lessons, following the formulaic learning strategy depicted within the SIMs

writing strategy (Deshler & Schumaker, 2006, 1988; & Schumaker et al., 1999). Single paragraphs were emphasized during November and multiple paragraphs working together as one essay were emphasized in December. Research and documentation strategies were taught during the month of January. Research writing lessons were taught in February and March. These lessons incorporated all the previously instructed skills producing one final written product. Again, only the experimental groups were instructed using the color-code schema and received color-coding guidance during these lessons.

The students were given various curriculum-based assessments to evaluate content mastery as required by the school district. These assessments were given in order to determine lessons necessitating re-teaching. Designated class time was not allotted for re-teaching purposes during this research study in order to maintain equality during all instructional periods. Instead, students, necessitating English tutorial as determined by below average curriculum-based assessments, were assigned to English tutorial during the school wide Mandatory Uninterrupted Study Time (known as MUST class). No color-coding enhancement instruction was given during this time.

Phase 3: TOWL-4 Post-Testing

Appendix G. TOWL-4 Assessment

The TOWL-4 assessment consists of two forms (Form A and Form B). The assessment measure begins with a corresponding picture card in which the students are given 5 minutes to prepare and 15 minutes to write a story about the event and activities depicted in the picture card (McCrimmon & Climie, 2011). This original story writing is reflective and assessed as subtest 6 and subtest 7. Subtest 6, Contextual Conventions, is story writing in response to a stimulus picture, with points earned for satisfying arbitrary requirements relative to orthographic and grammatical conventions. Subtest 7, Story Composition, is the evaluation relative to the quality of its composition. The assessment then continues with subtests 1 through 5. Subtest 1 is the vocabulary subtest. This is sentence writing that incorporates a stimulus word, which is administered as a single test. Various words, increasing in difficulty, are listed for the students to use within a sentence in order to demonstrate their knowledge of the particular given vocabulary words. Subtests 2 and 3 are spelling and punctuation. Spelling and punctuation are presented as one test but assessed as two separate tests. Spelling is the sentence writing from dictation, making proper use of spelling rules. Punctuation is the sentence writing from dictation, making proper use of punctuation and capitalization rules. A sentence is read to the examinee/student who then writes the sentence. The examinee/student must correctly spell and punctuate the dictated sentence. Subtest 4 is the Logical Sentences subtest. The Logical Sentences subtest presents the examinee/student 22 sentences with an incorrect element of logic. Examinees/students edit an illogical sentence in order to make better sense. Subtest 5 is the Sentence Combining subtest. The Sentence Combining subtest requires examinees to view several sentences and to combine them

into one coherent sentence. Examinees/students must integrate the meaning of several short sentences into one grammatically correct written sentence.

Students were given the TOWL-4 assessment during the first fourteen days of the fall semester of the 2012-2013 school year. Assessments were not scored in order to eliminate any potential teacher/researcher bias when instructing the English classes. During the month of April, students were given the TOWL-4 assessment again. All assessments were given individually and different forms of the assessment were given for pre- and post-tests. Sophomore students were given Form A as a pre-test and Form B as a post-test while junior students were given Form B as a pre-test and Form A as a post-test.

The TOWL-4 writing assessment was used to measure students' written expression skills in the area of conceptual development, organization and fluency, grammar and mechanics, and overall writing quality. First, conceptual development in writing skills refers to the relating or concern with the relations of concepts of some field of inquiry rather than simply with the facts. It is the ability to conceive an idea and develop it further from an abstract or generic idea generalized from particular instances. The seven subtests compiled together to score students' contrived writing (subtests 1-5) and spontaneous writing (subtests 6 and 7) skills were used to determine students' conceptual development.

Second, organization and writing fluency refer to the realization of existing relationships between separate components and the effective coordination and arrangement of separate writing components into a unit or structure, forming a coherent whole. Writing fluency refers to the ability to write textual content in order to accurately,

with ease and expression, inform readers of a particular topic idea. Fluent writing will narrate, describe, inform, or persuade readers. In the Sentence Combining subtest of the TOWL-4, the student will integrate the meaning of several short sentences into one grammatically correct written sentence. The sentences are evaluated on using all given information depicting the same informational content and concisely forming one sentence. In the Story Composition subtest of the TOWL-4, the student will write an original story that is based upon a particular picture. The story is evaluated on the quality of the composition: vocabulary, plot, prose, development of characters, and interest to the reader.

Third, grammar and mechanics refers to the rules for language regarding the way words are formed and put together to make sentences and how the individualistic details of these grammar rules work or the way they are implemented to form succinct sentences. The TOWL-4 subtest 3, Punctuation, subtest 4, Logical Sentences, and subtest 6, Contextual Conventions, were used to measure the grammar and mechanics of writing. The TOWL-4 subtest 3, Punctuation, was used to measure a particular set of language rules, involving the standardized marks that are used to organize writing into phrases, clauses, and sentences and by extension make its meaning clearer. In the Punctuation subtest, the student will write sentences from dictation. In the TOWL-4 subtest 4, Logical Sentences, students edit illogical sentences so that the sentence information makes better sense. The TOWL-4 subtest 6, Contextual Conventions, was derived from the story that students were designated to write, an original story that is based upon a particular picture. The story was evaluated on the grammar and mechanics' quality of the

composition: sentence structure and proficiency, punctuation use and proficiency, phrases and clauses, transitional quality, point of view, and verb tense.

Table G1
TOWL-4 Grade-Based Coefficient Alphas

Grade-Based Coefficient Alphas and SEMs												
	Grade											
TOWL-4 value	Form	4th	5th	6th	7th	8th	9th	10th	11th	12th	Avg $_{A+B}$	SEM $_{A+B}$
SUBTESTS												
Vocabulary	A	84	90	91	88	92	89	92	93	90	90	1
	B	86	89	90	90	91	89	1	94	90		
Spelling	A	90	91	91	89	91	85	90	92	90	91	1
	B	91	92	92	91	92	89	92	91	91		
Punctuation	A	91	92	92	92	94	92	93	93	92	92	1
	B	90	90	92	92	92	93	93	93	92		
Logical Sentences	A	81	75	78	71	81	75	80	73	77	76	1
	B	80	71	75	74	77	74	78	72	75		
Sentence Combining	A	87	85	84	84	86	85	89	89	86	87	1
	B	88	86	86	88	87	86	88	86	87		
Contextual Conventions	A	65	76	70	78	80	74	84	79	76	77	1
	B	69	76	74	82	80	76	80	77	77		
Story Composition	A	73	3	75	72	65	76	80	59	71	72	2
	B	68	63	81	74	74	76	84	64	74		
COMPOSITE												
Contrived Writing	A	96	96	96	95	96	95	96	96	96	96	3
	B	96	95	96	96	96	95	96	96	96		
Spontaneous Writing	A	80	80	82	82	82	84	88	80	82	82	6
	B	78	78	84	84	84	83	87	79	82		
Overall Writing	A	95	95	95	95	96	95	97	95	95	96	3
	B	95	95	96	96	96	96	97	96	96		

Hammill & Larsen (2009; Note: Avg.$_{A+B}$ = average coefficient for Forms A and B; SEM$_{A+B}$ =SEM for Forms A and B)

Oklahoma State University Institutional Review Board

Date:	Monday, August 06, 2012
IRB Application No	ED12114
Proposal Title:	Writing With Color Affect on Students' Comprehension of Writing Components
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 8/5/2013

Principal Investigator(s):

Claudia Cecilia Otto
2111 Berkshire Dr.
Ponca City, OK 74604

Christine Ormsbee
142 Telecom Center
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI, advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Shelia H. Kennison

Shelia Kennison, Chair
Institutional Review Board

Information Sheet
Administration Agreement to Conduct Research in the School/District

Project Title:
Writing with Color Affect on Students' Comprehension of Writing Components

Investigator(s):
Claudia C. Otto, Oklahoma State University Doctoral Student
Cell Phone: 580-767-0103 Email: claudia.otto@okstate.edu

Requested Participation:
1st) demographic information of 10th & 11th grade students attending the researcher's English class
2nd) daily Classroom Lessons and/or assessments sophomore and junior students

Purpose:
The purpose of this study is to determine the effectiveness of a color coding writing strategy on the writing performance of adolescents with learning disabilities. This will be accomplished with the use of a color coding strategy as an instructional enhancement to the already existing state and district approved curriculum. Comparisons of students' coursework achievement and assessments will be made between those students who learned the English lessons through the use of a color coding strategy and those who learned the English lessons without the color coding strategy.

Procedures:
I will continue to teach my students per state and district mandated curriculums. I will teach one sophomore and junior class each using my color coding enhancement using a systematic implementation of a daily life venue of color coding to research-based interventions addressing writing skills beginning at its foundation with parts of speech and continuing through sentence, paragraph, and essay writing can aid students to more readily understand the writing components and by extension enhance actual academic potential. I will also teach one sophomore and junior class each in the same manner but without the color coding enhancement in order to collect the coursework and assessment grades earned for comparison purposes.

Risks of Participation:
There are no known risks associated with this project which are greater than those ordinarily encountered in daily life.

Benefits:
It is expected that the school district will learn valuable information from the researcher that will help to inform administration of an instructional inquiry based methodology in order to enhance student critical thinking skills, accomplished through the use of inductive teaching strategies, problem-solving and constructivist approaches. The scaffolding of information will help to stimulate and increase students' thinking processes by obliging them to use reasoning skills in order to deduce conclusions from the presented facts. This should benefit other students in the district.

Confidentiality:
All information will be kept confidential as no names or identification numbers will be recorded on the final analysis or journal write-up. But all identities will be kept confidential by using an assigned classification letter. Only the researcher will know which collected student lessons and assessments pertain to which student. All data will be collected and logged into datasheets which will be destroyed in May of 2014 after the responses have been entered into a computer. No names or identification numbers will be recorded in the data file. All results will be reported as separate data and no student names will be reported. All data will be stored in a locked file cabinet to which only the researcher has a key. The OSU IRB has the authority to inspect consent records and data files to assure compliance with approved procedures.

Compensation:
Participants will receive no compensation by participating in this study.

Contacts:
If you desire to discuss your participation in this research study and/or request information about the results of the study please contact me. Claudia Otto at (580) 767-0103 / claudia.otto@okstate.edu or Dr. Chris Ormsbee, from Oklahoma State University at (405) 744-3471 / ormsbee@okstate.edu. If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.

Signatures:
I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form had been given to me.

_____ _____
Signature of Agreement to Conduct Research Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____ _____
Signature of Researcher Date

Okla. State Univ.
IRB
Approved 9/6/12
Expires 9/5/13
IRB # ED-12414

Parent / Guardian Permission for Research Form
Oklahoma State University

My name is Claudia C. Otto and I am doctoral student at Oklahoma State University and will be conducting research, with the help and guidance of my professor/advisor, Dr. Chris Ormsbee who is a professor at Oklahoma State University. My research is entitled, "Writing with Color Affect on Students' Comprehension of Writing Components." You are being contacted because your child is eligible to participate in this study. Participating in this research may help your child to earn better grades in written assignments because he/she may be using color coding to see particular subdivisions of writing which can enhance a student's comprehension of how writing unites words into sentences and ideas into coherent topics that narrate, describe, persuade, or explain. Students will realize that writing techniques are not foreign, archaic, boring, or stressful; but instead a fun way to exercise one's creativity and enhance one's writing capabilities in accomplishment of an original essay paper

The researcher will consist of me as your child's assigned English Teacher. I will continue to teach my students per state and district mandated curriculums. I will teach one sophomore and junior class each using my color coding enhancement and teach one sophomore and junior class each in the same manner but without the color coding enhancement in order to collect the coursework and assessment grades earned for comparison purposes. I will begin teaching my students using an inquiry based teaching methodology in order to enhance their critical thinking skills. I will accomplish this through the use of inductive teaching strategies, problem-solving and constructivist approaches. The scaffolding of information will help to stimulate and increase my students' thinking processes by obliging them to use reasoning skills in order to deduce conclusions from the presented facts. I will begin with specific details or evidence, and my students will provide a generalization, principle, or theme from the patterns that emerge because they will be more readily able to see the patterns with the color coding system. These visual, nonlinguistic representations will help my students recognize how related topics connect by seeing a logical organization of information. In fact, a color coding system will enable me to instruct my writing lessons from various approaches in order to incorporate different intelligences and learning styles: *linguistic, logical and mathematical* through the use of formulaic color coded interpretations, *visual and spatial* through the use of five different colors adding dimension, *bodily and kinesthetic* through the manipulation of emerging patterns, *intrapersonal* through students' deductions and self-reflective thinking, and *natural* by tying the colors to the natural environment. Consequently, a developed and implemented color-coding of concepts will enable my students to work from their specific areas of strength. No other students not targeted for the study will be told about the study's intent. I hope this will increase your child's writing skills, quality of writing, and overall comprehension of the writing process as a holistic process.

There are no known risks in allowing your child to participate in this study. It is expected that your child will not experience any additional stress other than those he/she would normally experience during the school day.

I will not be collecting any personal information during this research other than your child's disability diagnosis, age, grade level, performance level, and course grades (lessons, projects, and assessments). I will collect this information so that it may be explained in the study the relevance of a teaching strategy that stems from research-based interventions has on

students' process reasoning and comprehension respective to the writing process. Your child will be given a letter for identification purposes (for example: "Junior Student X). Any written results will discuss findings and will not include information that will identify your child. Records from this research will be kept private and stored securely so that only the researcher (myself) and people overseeing my research at OSU will have access to the records. It is possible that people from OSU will observe the data collection to safeguard the rights and wellbeing of the people who are participating in the research.

In an effort to maintain confidentially, individual student demographic data, lessons and assessment grades tallied on collection reports will be completed and read solely by your child's English teacher (myself). Final analysis data will be provided to the school following the completion of the study for the purpose of teacher training. Information gained through this research will be used for presentations at conferences and for journal articles.

If you desire to discuss your participation in this research study and/or request information about the results of the study please contact me, Claudia Otto at (580) 767-0103 / claudia.otto@okstate.edu or Dr. Chris Ormsbee, from Oklahoma State University at (405) 744-3471 / ormsbee@okstate.edu. If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.

Your participation in this research project is appreciated and completely voluntary. Neither you nor your child will receive any payment for your roles in this research. You or your child can withdraw from the research at any time. Your child will not receive negative grades or other negative effect if he decides to not participate in this study. There will be no penalties from the researchers; your child's paraprofessional, teacher or school; OSU research supervisor; or Oklahoma State University for participating, not participating, or withdrawing from the study. You may choose not to participate at any time without any penalty or problem.

Signatures:

I have read and fully understand the consent form. As parent or guardian, I authorize

_____ (print name) to participate in the described research.

A copy of this form has been given to me. _____ (parent/guardian initials)

_____ _____

Signature of Participant Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____ _____

Signature of Researcher Date

Okla. State Univ.
IRB
Approved 8/6/12
Expires 8/5/13
IRB # ED-12-119

Informed Consent Form
Student Assent Form for Participation

Project Title:
Writing with Color Affect on Students' Comprehension of Writing Components

Purpose:
I am doing a research project at Oklahoma State University (OSU). I am interested in helping increase the writing performance of adolescents with learning disabilities by teaching them to deduce patterns and categorize them into logical and manageable segments of information in order to simplify the writing process. This will be accomplished with the use of a color coding strategy as an instructional enhancement to the already existing state and district approved curriculum. Comparisons of students' coursework achievement and assessments will be made between those students who learned the English lessons through the use of a color coding strategy and those who learned the English lessons without the color coding strategy.

I would like your permission to compare your coursework assignments and assessments with other students' grades. I want to make comparisons between those students who learned the English lessons through the use of a color coding strategy and those who learned the English lessons without the color coding strategy.

Your parent(s) / guardian(s) are aware of this project.

Procedures:
As the researcher, I agree to make sure that the following conditions are met:

1. I will teach your class in according to the existing state and district approved curriculum.
2. One year after my OSU graduation from the Ph.D. program, all the collected information and observation notes will be destroyed.
3. I will assign you a letter, instead of using your name, on any notes that I take. Your real name will not be used at any time during my project or on any of my papers that I write for this research project.

If you have any questions about this form or what I am doing, please ask me.
Thank you for your help.
Sincerely,

Claudia Otto
Professional Educational Studies Doctoral Student, Oklahoma State University

_____
Print your Name (Participant)

_____ _____
Your Signature (Participant) Date

VITA

Claudia Cecilia Otto

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE EFFECTS OF A COLOR-EMBEDDED WRITING STRATEGY ON THE WRITTN EXPRESSION SKILLS OF STUDENTS WITH MILD-MODERATE DISABILITIES

Major Field: Professional Education Studies; Specialization in Special Education

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Professional Education Studies at Oklahoma State University, Stillwater, Oklahoma in December, 2013.

Completed the requirements for the Master of Science in Teaching, Learning, and Leadership at Oklahoma State University, Stillwater, Oklahoma in 2008.

Completed the requirements for the Bachelor of Science in Business Administration at Oklahoma State University, Stillwater, Oklahoma in 1993.

Experience:

Disability Services Specialist for the Oklahoma State Department of Career and Technology Education, Stillwater, Oklahoma

Research Assistant/Graduate Associate/Graduate Course Facilitator for the College of Education at Oklahoma State University, Stillwater, Oklahoma

Special Education English Teacher for Ponca City Senior High School, Ponca City, Oklahoma

Professional Memberships:

National Education Association & Oklahoma Education Association
Council for Exceptional Children & Division on Autism & Developmental Disabilities
Golden Key International Honour Society
Phi Kappa Phi Honor Society
Kappa Delta Pi International Honor Society in Education